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MANAGEMENT 101

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Table of Contents: Bulkpack No. 1

1. Benjamin Franklin and the Definition of American Values
2. Samuel Slater, Francis Cabot Lowell, and the Beginnings of the Factory System in the United States
3. Work: Craft and Factory in Nineteenth Century America
4. The Coming of the Railroads
5. Railroads and the Beginnings of Modern Management
6. Jay Gould and the Coming of Railroad Consolidation
7. Business Failure, Redefinition of Claims, and Financial Innovation: A Nineteenth Century Case Study
8. The Standard Oil Company [A]
9. J.P. Morgan
10. The Integration of Mass Production and Mass Distribution
11. Mass Production and the Beginnings of Scientific Management
12. Organized Labor and the worker
13. Du Pont: The Centralized Structure
14. The Conglomerates and the Merger Movement of the 1960s
15. Nineteenth Century Retailing and the Rise of the Department Store

1. … of American Values
2. … and the Beginnings of
… History … Case Studies
3. …
4. …
… of Power, Distribution
… of Scientific Management

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Benjamin Franklin and the Definition of American Values (Abridged)

All that has happened to you is also connected with the detail of the manners and situation of a rising people.[1]

* * * * *

Benjamin Franklin, who through versatile talents became internationally the most widely known American of his time, was born in Boston in 1706. His father, Josiah, had left England about 1683, partly to better his economic condition and partly because of his alienation from the Church of England. He had settled with his wife and three children in Boston, then a town of 5,000 or 6,000 inhabitants, and, finding no demand for his skill as a dyer of cloth, had turned to making and selling candles and soap to support a growing family. His wife died after bearing four more children, and in 1689 Josiah married Abiah Folger, the daughter of one of the early English settlers on Nantucket. She bore him ten children; Benjamin was the youngest of the six boys.

Benjamin's father contemplated educating him for the ministry and to this end sent him to a classical grammar school at the age of eight. But less than a year later, when Josiah fully realized the expense involved in such training, including four years of college, he moved Benjamin to a more practical academic environment where the chief subjects were writing and arithmetic. Thus Ben's acquisition of Latin was postponed until he decided to tackle it some twenty years later, along with French, Italian, Spanish, and German.

His father took him at the age of ten into his chandler's shop. Ben did not like the work and betrayed a restless interest in going to sea. Seeking to place him in a more congenial occupation, Josiah apprenticed him to his half-brother James, a printer, who shortly thereafter started to publish the weekly *New England Courant*.

This case was originally prepared from published sources by Josepha M. Perry under the direction of Dr. Barry E. Supple. Professor Richard S. Tedlow prepared a revised version, which has been condensed and further revised by Patricia Denault under the direction of Professor Thomas K. McCraw as the basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation.

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1. Benjamin Vaughan to Benjamin Franklin, January 31, 1783.

This newspaper was spokesman for a group of liberal thinkers frequently at odds with Massachusetts's colonial government, and Ben worked in a stimulating intellectual atmosphere. He had been an avid reader of such books as he could lay hands on, notably essays and the *Spectator*, which served as inspiration for his own writings. His first published pieces were the "Silence Dogood Papers," slipped anonymously under the door of his brother's office and printed in the *Courant* on their own merit with no suspicion of their authorship when Ben was only 16.

After five years Ben quarreled with James and ran away, first to New York and then on to Philadelphia in search of work in a printing office. This he found with Samuel Keimer before he had quite spent the Dutch dollar and copper shilling that constituted his entire financial resources on arrival. At 17 he was a well-trained printer, capable of handling plain typesetting and presswork. Just as important, he had already acquired the ability to make friends and attract favorable attention that later smoothed his path in public life.

The first patron he attracted, however, proved a feeble support. Sir William Keith, Governor of Pennsylvania, heard of Ben through Ben's brother-in-law and encouraged him to set up his own printing business. Ben's father having refused to supply the capital for such a precocious venture, Keith sent Ben off to London to buy equipment, promising him letters of credit to finance the project. But Keith was not a man to keep promises, and Franklin found himself in London with no money for equipment or for passage home. He was, however, sufficiently expert at his trade to earn a good living.

In spite of his now-famous veneration of thrift as the chief virtue, Franklin took advantage of London's metropolitan attractions, such as the theater and other amusements. In consequence he saved nothing for transportation back to America. But life in London in 1725 was a stimulating experience. It was an "age of intellect," influenced by the presence of William Hogarth, Henry Fielding, Daniel Defoe, and Isaac Newton. Franklin wrote of this period in his *Autobiography*:

> Most part of the time I work'd hard at my business, and spent but little upon myself except in seeing plays and in books. . . . I had by no means improv'd my fortune; but I had picked up some very ingenious acquaintance, whose conversation was of great advantage to me; and I had read considerably.[2]

After 19 months, however, Franklin was ready to accept a proposition that he return to Philadelphia with Thomas Denham, a wealthy Quaker merchant who had met him on the ship to England. Denham wanted Franklin to go back and assist in a store Denham was going to open, and he promised to teach Franklin the mercantile trade. After less than a year, Denham's death ended Franklin's career as clerk and bookkeeper, and he went back to run the printing house for Keimer, his first Philadelphia employer.

Relationships were strained at Keimer's; and Hugh Meredith, a fellow worker, persuaded Franklin to take him as a partner and start a printing office with capital supplied by Meredith's father. The father sent to London for the necessary equipment, and early in 1728 Meredith and

2. *The Autobiography of Benjamin Franklin* (New York, 1927), p. 103.

Franklin took a house on Market Street for £24 a year. They rented part of it to a family with whom they boarded and set up their printing paraphernalia in the rest.

Competition was keen at first with three printers in the city. Keimer, however, failed in 1729. Franklin bought the newspaper Keimer had recently started and issued it as the *Pennsylvania Gazette*. Andrew Bradford was a stronger rival; as government printer for Pennsylvania, he had a backlog of lucrative jobs. Franklin made short work of this advantage by printing an "Address from the Assembly to the Governor" in his own paper and giving a copy to every Assembly member. The workmanship was so superior to Bradford's that in 1730 Franklin obtained the government contract. Later he became public printer for New Jersey and Maryland.

Meredith, who was given to drink, was proving an unstable partner, and his father had not completed payment on the imported equipment. With loans from two friends, Franklin was able to pay back £100 of the elder Meredith's capital and, as was required in an era before limited liability, to assume his partner's personal as well as his business debts in order to dissolve the partnership.

Franklin was now becoming well known in the city; he had an enthusiastic group of friends; and he was the best writer in America at that time. Columns of his worldly wise humor increased the circulation of his *Gazette*. In his *Autobiography* he wrote:

> In order to secure my credit and character . . . I took care not only to be in reality industrious and frugal but to avoid all appearance to the contrary. I dressed plainly; I was seen at no places of idle diversion. I never went a-fishing or shooting; a book, indeed, sometimes debauched me from my work, but that was seldom, snug, and gave no scandal; and, to show that I was not above my business, I sometimes brought home the paper I purchased at the stores through the streets on a wheelbarrow.[3]

In 1730 Franklin married Deborah Read, a woman incapable of sharing his intellectual interests but a devoted and patient wife.. They lived in the house where the printing office was, and she helped with the shop he set up there to sell stationery and books imported from England. Over a period of years his stock expanded to include foodstuffs such as coffee, cheese, codfish, and mackerel in barrels, as well as cloth, stockings, spectacles, maps, compasses, and a multitude of other goods. He could without expense apprise the public of items on hand by advertisements in his *Gazette*. In 1737 he became postmaster of Philadelphia with the legal right to send his newspaper out by the postriders. He published books and pamphlets as well as doing job printing. Capital began to accumulate to a point where he felt ready to invest it.

Apparently with two purposes in mind—to make money and to encourage the spread of printing—Franklin became a silent partner in several enterprises, usually setting up a protégé with presses, paying one-third of the going expenses, and receiving one-third of the profits. In Charleston, South Carolina, in Antigua and Jamaica, and in Lancaster, Pennsylvania, printing houses were started with his participation. In Philadelphia he had two or three partners publishing German books and papers. The most enduring of these ventures was with one of his

3. Leonard W. Labaree *et al.*, eds., *The Autobiography of Benjamin Franklin* (New Haven: Yale University Press, 1975), pp. 125-126.

journeymen, James Parker, whom he sent to New York. Upon the retirement of the only other printer there, Parker took over the *New York Gazette* and became public printer for the province. He also established in partnership with Franklin an office in New Haven, procured the printing business of Yale College, and established the *Connecticut Gazette*.

With modest financial success achieved, Franklin took a partner into his own printing office and retired from active operation of the business to a life of leisure for the writing, study, and scientific experimentation that his inquiring mind craved. From England in 1743 he had, upon the recommendation of a friend, hired David Hall, who proved a satisfactory manager. In 1748 at the age of 42, Franklin wrote that he had put his printing house under the care of his partner, ceased bookselling, and moved to a quieter part of town. Until 1766 the business was known as Franklin and Hall, and, according to agreement, Hall paid Franklin an income averaging nearly £500 a year from the partnership during that period.

In addition to Hall's payments, Franklin had, when he retired, a small salary as postmaster of Philadelphia and an income estimated at about £700 a year from invested savings. Some part of his wealth was in houses and lots in Philadelphia. After the Revolution this property increased in value to perhaps three times its original cost to him. From the public positions he later held he received varying stipends.

Franklin's fame as well as his fortune were enhanced by the publication of *Poor Richard's Almanack*, the first number of which was for the year 1733. Almanacs had a ready market in the eighteenth century; they circulated far outside of towns in peddlers' packs, sometimes the only bit of reading matter that a family purchased. Calendars, tide tables, phases of the moon, weather prophecies, and scraps of astrology were supplemented by recipes, poems, and jottings of wit and wisdom. In this latter field, Franklin's almanac outdid its rivals. In the person of Richard Saunders he created a mouthpiece for old sayings, frequently with a new and pithy twist, and original quips for the edification and amusement of a solid colonial citizenry.

Poor Richard's Almanack was an immediate success, selling 10,000 copies within the first three months of publication. Franklin's partners stocked it in their bookshops and advertised it in the various *Gazettes* they published. Under the title of "The Way to Wealth," the preface to the 1758 edition contained a compilation of "Poor Richard's" sayings, particularly those dealing with thrift and enterprise. It was widely reprinted and translated into 15 languages. It was published in broadsides and posted on walls in England; it was handed to parishioners by the clergy in France.

Franklin's creative talents had a practical turn and he invented a number of useful contrivances. The "Pennsylvania fireplace," an open-front stove with doors, allowed all the cheer of a crackling fire in a grate and gave good circulation of heat besides, since it could be set well out from the wall. Bifocal spectacles and a "long arm" for reaching and clasping books or merchandise on high shelves are credited to his ingenuity. His most famous invention was the lightning rod, an outgrowth of experiments with flying a kite in a thunderstorm to prove a connection between lightning and electricity. Such a connection was being studied by many scientists in Europe, and Franklin's independent proof added luster to the reputation he was already achieving abroad. His lightning rod was widely and enthusiastically adopted in this country as a protective device. Franklin took out no patents on any of his inventions. The model for his stoves he turned over to a friend with an iron foundry who manufactured them on his own

account. A genuine concern for human welfare seems to have been a motive in much that Franklin did.

Among other public services, Franklin established a lending library, organized the first fire brigade in Philadelphia, helped to start a hospital, and also the Academy of Philadelphia, which eventually grew into the University of Pennsylvania.

From 1750 to 1764 Franklin was annually elected to the Assembly of Pennsylvania by the popular, or progressive, party. Through many of those years he was in London as Colonial Agent for Pennsylvania. The friends he made there in political and fashionable circles stood him in good stead when he went back again in 1764 and faced not only Pennsylvania's problems but the whole question of relations between England and the Colonies. His influence was felt in the repeal of the Stamp Act in 1766. Georgia, New Jersey, and Massachusetts also appointed him as agent, so great was his prestige. He traveled on the Continent during this period and was enthusiastically welcomed in France and Germany by economists, philosophers, and scientists who had read his pamphlets or heard of his work, again widening his reputation in a way that later strengthened his diplomatic influence.

On his return to Philadelphia in 1775, all efforts to keep the peace having failed, his public position in America was firm. He was elected to the Congress and was on the committee that framed the Declaration of Independence. In September 1776, he crossed the Atlantic again as the most important of three commissioners to France, seeking aid for the American cause. He remained after the fighting stopped to arrange terms of peace with England, a touchy mission that involved relations with France as well. After the signing of the treaty in 1783, Franklin stayed on as minister to France for two years.

His life in France was a diplomatic and personal triumph. Among scientists and philosophers, at a time when "philosophy was the fashion" in France, he already had friends and cultivated more. His ability to charm both men and women seems to have flowered, and since women were socially important in France, his popularity with them enhanced his public renown. Louis XVI and Marie Antoinette received him graciously. French monetary aid, as gifts and loans, flowed to the new nation. Franklin contributed political articles to French papers and also wrote for distribution among his friends a series of short and pleasant essays called *Bagatelles*, which had a wide vogue.

In 1785 Franklin resigned his post and went back to Philadelphia. At home he continued political activities as President of the Commonwealth of Pennsylvania until ill health in 1788 forced his retirement.

Printer, author, philanthropist, inventor, statesman, diplomat, scientist, Benjamin Franklin died on April 17, 1790, full of years and honors. His name was known throughout the Western world. In his own life, he seemed to personify the strivings of many of his contemporaries and also of Americans who came after him. From penniless vagabondage, he accumulated an estate valued at about a quarter of a million dollars at the time of his death. Despite only two years of formal schooling, he received honorary degrees from Harvard, Yale, and Oxford. The commonest of common men, he became the honored guest of statesmen and royalty. In the words of his greatest biographer:

> In any age, in any place Franklin would have been great. Mind and will, talent and art, strength and ease, wit and grace met in him as if nature had been lavish and happy when he was shaped. Nothing seems to have been left out except a passionate desire, as in most men of genius, to be all ruler, all soldier, all saint, all poet, all scholar, all some one gift or merit or success. Franklin's powers were from first to last in a flexible equilibrium. Even his genius could not specialize him. He moved through his world in a humorous mastery of it.[4]

Franklin, however, has always been a figure of controversy. His numerous critics have attacked him for what they viewed as his hypocrisy, his delight in manipulation, and his neglect of the spirit. Franklin's vision of the wise person, they felt, was of one who did indeed live by bread alone.

Some writers, especially nineteenth-century Romantics, pilloried what they perceived as Franklin's extreme scientific rationalism, devoid of true spirituality and humanity. They viewed such writings as Franklin's search for moral perfection (reprinted here as **Exhibit 1**) as hypocritical and foolish. In a 1854 short story, "The Lightning-Rod Man," Herman Melville presented a thinly disguised attack on Franklin and his "precepts":

> . . . Do you think that because you can strike a bit of green light from the Leyden jar, that you can thoroughly avert the supernal bolt? . . . Who has empowered you . . . to peddle around your indulgences from divine ordination? . . . But . . . the lightning-rod man still dwells in the land; still travels in storm-time, and drives a brave trade with the fears of man.[5]

Max Weber, the well-known German sociologist, saw in Franklin the very incarnation of "the spirit of capitalism" that had swept away the world view of previous ages. Reviewing aphorisms such as those in "Advice to a Young Tradesman" (reproduced in **Exhibit 2**), Weber observed in *The Protestant Ethic and the Spirit of Capitalism:*

> The peculiarity of this philosophy of avarice appears to be . . . above all the idea of a duty of the individual toward the increase of his capital, which is assumed as an end in itself. Truly what is here preached is not simply a means of making one's way in the world, but a peculiar ethic. The infraction of its rules is treated not as foolishness but as forgetfulness of duty. That is the essence of the matter. It is not mere business astuteness, that sort of thing is common enough, it is an ethos. *This* is the quality which interests us. . . .
>
> The spirit of capitalism, in the sense in which we are using the term, had to fight its way to supremacy against a whole world of hostile forces. A state of mind such as that expressed in the passages we have quoted from Franklin, and which called forth the applause of a whole people, would both in ancient times and in the Middle Ages have been proscribed as the lowest sort of avarice and as an attitude entirely lacking in self-respect. It is, in fact, still regularly thus looked

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4. Carl Van Doren, *Benjamin Franklin* (New York: Garden City Publishing Co., 1941), p. 782.
5. Herman Melville, "The Lightning-Rod Man," *The Writings of Herman Melville* 9 (Evanston, Ill., 1987), p. 124.

> upon by all those social groups which are least involved in or adapted to modern capitalistic conditions.[6]

Certainly, many an entrepreneur has been inspired by Franklin's example and precepts. Thomas Mellon, founder of one of America's great fortunes, wrote that "the reading of Franklin's *Autobiography* was the turning point in my life." It prompted him to leave the family farm and enter finance. Mellon later had a thousand copies of the *Autobiography* printed to be distributed to young men asking for advice. In a 2,600-page collection of business documents from ancient times to the present, compiled by three scholars from the Harvard Business School, Franklin's name appears more often than that of any other individual.[7] In 1983, a new biography of Franklin merited a review on the *Wall Street Journal's* editorial page, where he was described as a man who "can still enthrall . . . us."[8]

Franklin's influence has also been felt among the nation's leading intellects. Jared Sparks, who rose from a poor Connecticut farm to the presidency of Harvard, wrote that Franklin's autobiography "first roused my mental energies . . . prompted me to resolutions, and gave me strength to adhere to them. . . . It taught me that circumstances have not a sovereign control over the mind."[9]

6. Max Weber, *The Protestant Ethic and the Spirit of Capitalism*, trans. Talcott Parsons (1904; New York: Scribner's, 1930), pp. 51, 56.
7. Edward C. Bursk, Donald T. Clark, and Ralph W. Hidy, eds., *The World of Business* (New York: Simon and Schuster, 1962), Vol. II, p. 1070.
8. *Wall Street Journal*, January 25, 1983, p. 32.
9. See Labaree, *Franklin*, pp. 10-11.

Exhibit 1 Franklin on "Moral Perfection"

The following is a famous passage from Franklin's *Autobiography*.

It was about this time I conceiv'd the bold and arduous project of arriving at moral perfection. I wish'd to live without committing any fault at any time; I would conquer all that either natural inclination, custom, or company might lead me into. As I knew, or thought I knew, what was right and wrong, I did not see why I might not always do the one and avoid the other. But I soon found I had undertaken a task of more difficulty than I had imagined. While my care was employ'd in guarding against one fault, I was often surprised by another; habit took the advantage of inattention; inclination was sometimes too strong for reason. I concluded, at length, that the mere speculative conviction that it was our interest to be completely virtuous, was not sufficient to prevent our slipping; and that the contrary habits must be broken, and good ones acquired and established, before we can have any dependence on a steady, uniform rectitude of conduct. For this purpose I therefore contrived the following method.

In the various enumerations of the moral virtues I had met with in my reading, I found the catalogue more or less numerous, as different writers included more or fewer ideas under the same name. Temperance, for example, was by some confined to eating and drinking, while by others it was extended to mean the moderating of every other pleasure, appetite, inclination, or passion, bodily or mental, even to our avarice and ambition. I propos'd to myself, for the sake of clearness, to use rather more names, with fewer ideas annex'd to each, than a few names with more ideas; and I included under thirteen names of virtues all that at that time occurr'd to me as necessary or desirable, and annexed to each a short precept, which fully express'd the extent I gave to its meaning.

These names of virtues, with their precepts, were:

1. TEMPERANCE.—Eat not to dullness; drink not to elevation.

2. SILENCE.—Speak not but what may benefit others or yourself; avoid trifling conversation.

3. ORDER.—Let all your things have their places; let each part of your business have its time.

4. RESOLUTION.—Resolve to perform what you ought; perform without fail what you resolve.

5. FRUGALITY.—Make no expense but to do good to others or yourself; i.e., waste nothing.

6. INDUSTRY.—Lose no time; be always employ'd in something useful; cut off all unnecessary actions.

7. SINCERITY.—Use no hurtful deceit; think innocently and justly, and, if you speak, speak accordingly.

8. JUSTICE.—Wrong none by doing injuries, or omitting the benefits that are your duty.

9. MODERATION.—Avoid extremes; forbear resenting injuries so much as you think they deserve.

10. CLEANLINESS.—Tolerate no uncleanliness in body, cloths, or habitation.

11. TRANQUILLITY.—Be not disturbed at trifles, or at accident's common or unavoidable.

12. CHASTITY.—Rarely use venery but for health or offspring, never to dullness, weakness, or the injury of your own or another's peace or reputation.

13. HUMILITY.—Imitate Jesus and Socrates.

My intention being to acquire the *habitude* of all these virtues, I judg'd it would be well not to distract my attention by attempting the whole at once, but to fix it on one of them at a time; and, when I should be master of that, then to proceed to another, and so on, till I should have gone thro' the thirteen; and, as the previous acquisition of some might facilitate the acquisition of certain others, I arrang'd them with that view, as they stand above. . . .

I made a little book, in which I allotted a page for each of the virtues. I rul'd each page with red ink, so as to have seven columns, one for each day of the week, marking each column with a letter for the day. I cross'd these columns with thirteen red lines, marking the beginning of each line with the first letter of one of the virtues, on which line, and in its proper column, I might mark, by a little black spot, every fault I found upon examination to have been committed respecting that virtue upon that day.

Form of the Pages

TEMPERANCE

Eat not to dullness; drink not to elevation

	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
Tem.							
Sil.	*	*		*		*	
Ord.	*	*			*	*	*
Res.		*				*	
Fru.		*				*	
Ind.			*				
Sinc.							
Jus.							
Mod.							
Clea.							
Tran.							
Chas.							
Hum.							

I determined to give a week's strict attention to each of the virtues successively. Thus, in the first week, my great guard was to avoid every the least offence against *Temperance*, leaving the other virtues to their ordinary chance, only marking every evening the faults of the day. Thus, if in the first week I could keep my first line, marked T, clear of spots, I suppos'd the habit of that virtue so much strengthen'd, and its opposite weaken'd, that I might venture extending my attention to include the next, and for the following week keep both lines clear of spots. Proceeding thus to the last, I could go thro' a course compleat in thirteen weeks, and four courses in a year. . . .

(Franklin provides a discussion of how he fared with regard to various of these virtues. What follows is part of his discussion concerning "Order.")

The precept of *Order* requiring that *every part of my business should have its allotted time*, one page in my little book contain'd the following scheme of employment for the twenty-four hours of a natural day.

The Morning. Question. What good shall I do this day?	5 [o'clock] 6 7	Rise, wash and address *Powerful Goodness*! Contrive day's business, and take the resolution of the day; prosecute the present study, and breakfast.
	8 9 10 11	Work.
Noon	12 1	Read, or overlook my account, and dine.
	2 3 4 5	Work.
Evening. Question. What good have I done to-day?	6 7 8 9	Put things in their places. Supper. Music or diversion, or conversation. Examination of the day.
Night.	10 11 12 1 2 3 4	Sleep.

I enter'd upon the execution of this plan for self-examination, and continu'd it with occasional intermissions for some time. I was surpris'd to find myself so much fuller of faults than I had imagined; but I had the satisfaction of seeing them diminish. To avoid the trouble of renewing now and then my little book, which, by scraping out the marks on the paper of old faults to make room for new ones in a new course, became full of holes, I transferr'd my tables and precepts to the ivory leaves of a memorandum book, on which the lines were drawn with red ink, that made a durable stain, and on those lines I mark'd my faults with a black-lead pencil, which marks I could easily wipe out with a wet sponge. After a while I went thro' one course only in a year, and afterward only one in several years, till at length I omitted them entirely, being employ'd in voyages and business abroad, with a multiplicity of affairs that interfered; but I always carried my little book with me.

My scheme of ORDER gave me the most trouble; and I found that, tho' it might be practicable where a man's business was such as to leave him the disposition of his time, that of a journeyman printer, for instance, it was not possible to be exactly observed by a master, who must mix with the world, and often receive people of business at their own hours. *Order*, too, with regard to places for things, papers, etc., I found extremely difficult to acquire. I had not been early accustomed to it, and, having an exceeding good memory, I was not so sensible of the inconvenience attending want of method. This article, therefore, cost me so much painful attention, and my faults in it vexed me so much, and I made so little progress in amendment, and had such frequent relapses, that I was almost ready to give up the attempt, and content myself with a faulty character in that respect. . . .

Source: *The Autobiography of Benjamin Franklin* (New York, 1976), pp. 82-87.

Exhibit 2 Franklin's "Advice to a Young Tradesman" (1748)

To My Friend, A. B.:

As you have desired it of me, I write the following hints, which have been of service to me, and may, if observed, be so to you.

Remember, that time is money. He that can earn ten shillings a day by his labor, and goes abroad, or sits idle, one half of that day, though he spends but sixpence during his diversion or idleness, ought not to reckon that the only expense; he has really spent, or rather thrown away, five shillings besides.

Remember, that credit is money. If a man lets his money lie in my hands after it is due, he gives me the interest, or so much as I can make of it during that time. This amounts to a considerable sum where a man has good and large credit, and makes good use of it.

Remember that money is of the prolific, generating nature. Money can beget money, and its offspring can beget more, and so on. Five shillings turned is six, turned again it is seven and three-pence, and so on till it becomes an hundred pounds. The more there is of it, the more it produces every turning, so that the profits rise quicker and quicker. He that kills a breeding sow, destroys all her offspring to the thousandth generation. He that murders a crown, destroys all that it might have produced, even scores of pounds.

Remember, that six pounds a year is but a groat a day. For this little sum (which may be daily wasted either in time or expense unperceived) a man of credit may, on his own security, have the constant possession and use of an hundred pounds. [Franklin is referring obliquely to the interest rate, which was fixed by law at 6 percent; to borrow 100 pounds, therefore, a person would need to have 6 pounds as security that he could pay the interest.] So much in stock, briskly turned by an industrious person, produces great advantage.

Remember this saying, "The good paymaster is lord of another man's purse." He that is known to pay punctually and exactly to the time he promises, may at any time, and on any occasion, raise all the money his friends can spare. This is sometimes of great use. After industry and frugality, nothing contributes more to the raising of a young man in the world than punctuality and justice in all his dealings; therefore never keep borrowed money an hour beyond the time you promised, lest a disappointment shut up your friend's purse forever.

The most trifling actions that affect a man's credit are to be regarded. The sound of your hammer at five in the morning, or nine at night, heard by a creditor, makes him easy six months longer; but, if he sees you at a billiard table, or hears your voice in a tavern, when you should be at work, he sends for his money the next day; demands it, before he can receive it, in a lump.

It shows, besides, that you are mindful of what you owe; it makes you appear a careful as well as an honest man, and that still increases your credit.

Beware of thinking all your own that you possess, and of living accordingly. It is a mistake that many people who have credit fall into. To prevent this, keep an exact account for some time, both of your expenses and your income. If you take the pains at first to mention

particulars, it will have this good effect: you will discover how wonderfully small, trifling expenses mount up to large sums, and will discern what might have been, and may for the future be saved, without occasioning any great inconvenience.

In short, the way to wealth, if you desire it, is as plain as the way to market. It depends chiefly on two words, industry and frugality; that is, waste neither time nor money, but make the best use of both. Without industry and frugality nothing will do, and with them everything. He that gets all he can honestly, and saves all he gets (necessary expenses excepted), will certainly become rich, if that Being who governs the world, to whom all should look for a blessing on their honest endeavors, doth not, in his wise providence, otherwise determine.

—An Old Tradesman

Exhibit 3 Chronology of Franklin's Life

1/17/1706:	Born in Boston
1718:	Apprenticed to his brother James, a printer.
4/2/1722:	First "Silence Dogood" paper published in *New England Courant.*
1723:	Runs away to Philadelphia. Enters employ of Samuel Keimer, a printer, soon after arrival.
11/5/1724:	Sails to England, where he works as a printer.
1726:	Returns to Philadelphia.
1726-1727:	Works as a clerk in a merchant's shop and then once again as a printer for Keimer.
1727:	Organizes the Junto, a society for the discussion of issues of the day.
1728:	Forms a printing partnership with Hugh Meredith.
10/2/1729:	Franklin and Meredith take over *The Pennsylvania Gazette.*
1/29/1730:	Franklin and Meredith become printers to the Assembly.
7/14/1730:	Franklin buys Meredith out.
11/8/1731:	Organizes subscription library.
12/19/1732:	First edition of *Poor Richard's Almanack.*
12/7/1736:	Forms Union Fire Company, Philadelphia's first.
10/5/1737:	Becomes postmaster of Philadelphia, serving until 1753.
1739-1740:	Invents "Franklin stove."
5/14/1743:	Publishes *Proposal for Promoting Useful Knowledge* which leads to the formation of the American Philosophical Society.
1/1/1748:	Forms 18-year partnership with David Hall, retires from active printing business.
11/3/1749:	Elected president of trustees of Academy of Philadelphia, later the University of Pennsylvania.
1751-1754:	*Experiments and Observations on Electricity* published.
5/11/1751:	Influential in chartering the Pennsylvania Hospital.
3/25/1752:	Becomes president of Philadelphia's first fire insurance company.
10/19/1752:	Publishes account of kite experiment.
1754:	Albany Congress adopts Plan of Union, based largely on Franklin's proposals.
1755-1756:	Active in defense against Indians. Builds forts and is commissioned colonel of a Philadelphia militia regiment.
4/29/1759:	Elected Fellow of the Royal Society.
1757-1762:	First mission to England to represent the Assembly in its dispute with Thomas and Richard Penn. Receives many honors, including an honorary D.C.L. from Oxford on April 30, 1762.
1762-1764:	Philadelphia. Various political activities and pamphleteering including *A Narrative of the Late Massacres* denouncing Indian haters.
1764-1775:	Second mission to England as agent for the Pennsylvania Assembly. Also appointed agent for Georgia (1768), New Jersey (1769), and Massachusetts (1770). During these tumultuous years, he became the most important colonial representative in Britain.

He committed his greatest political blunder in 1765 in underestimating American opposition to the Stamp Act, yet succeeded in ameliorating his standing at home.

1775-1776: Helps draft and signs the Declaration of Independence. Involved in diplomatic activities and military provisioning.

1776-1785: Mission to France. Purpose: to secure French alliance and aid and take other actions to strengthen America's international position. On March 12, 1781, Franklin asked Congress to relieve him of his duties as minister, pleading age and ill health. Not only is no action taken on this request, but three months later he is appointed one of the commissioners to negotiate peace with Great Britain.

1785-1790: Philadelphia.

4/23/1787: Pennsylvania Society for Promoting the Abolition of Slavery reorganized with Franklin elected president.

1787: Participates in Constitutional Convention and is one of the signers of the Constitution itself.

10/14/1788: Ends service as president of the Supreme Executive Council of Pennsylvania, thus bringing his career as holder of public office to a close.

2/3/1790: In his final public document, he signs a Pennsylvania Abolition Society petition to Congress against slavery and the slave trade.

4/17/1790: Benjamin Franklir. dies.

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WHARTON REPROGRAPHICS 2

Samuel Slater, Francis Cabot Lowell, and the Beginnings of the Factory System in the United States

Introduction

In nearly every country, the first modern factories have produced cotton textiles. As a nation industrializes, cotton manufacturing leads the way. This has been true in the 20th century for such developing countries as Mexico and India, and it was the case in the 18th century for Great Britain, the first industrial nation.

Britain had long been a major producer of hand-spun and hand-woven woolen yarn and cloth. In the last decades of the 18th century, a series of mechanical inventions made possible the production of cloth from raw cotton by water-powered and then steam-powered machines. The invention of these machines not only set off the industrial revolution in Britain but also had a powerful impact on the American economy by creating a huge, wholly new demand for cotton. As a result, cotton was first grown commercially in the United States in 1786. After the invention of the cotton gin in 1793 made possible the exploitation of upland cotton, that crop, and with it the slave-staffed plantation system, spread rapidly inland and westward, with dire results for American society.

Cotton textile machinery also soon found its way to the United States. In 1789, Samuel Slater, a skilled British mechanic, came to Rhode Island. There, financed by members of an established mercantile family, the Browns, he established the first spinning mill in America.

Because weaving was more complex than spinning, it was mechanized more slowly. In 1813, Francis Cabot Lowell, scion of a prominent Boston mercantile clan, brought from England to the United States the plans for a power loom. Lowell's achievement was more than just introducing the new weaving machines; by placing these looms in the same building with improved spinning machinery, he built the first integrated textile mill in the United States.

This case was originally prepared by Professor Alfred D. Chandler, Jr. as the basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation. Other contributors to the case have been Thomas R. Navin and Glenn Porter. The section on Slater is based on a case entitled "Samuel Slater and the American Textile Industry" that first appeared in N.S.B. Gras and Henrietta Larson, Casebook in American Business History (New York: Appleton-Century-Crofts, 1939), pp. 209-30, and was revised in 1974.

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The following two selections deal with the beginnings of the textile industry in the United States and the coming of the factory system. The first selection has been compiled from the records of Samuel Slater and his associates, particularly the records of the partnership of Almy and Brown, which financed Slater's activities and marketed the output of his mills. The second is from a memoir written by Nathan Appleton in 1858. Appleton, a close friend and ally of Francis Cabot Lowell, assisted in financing the latter's venture and in marketing his goods, and then in setting up the first planned industrial city in the United States, which was named for Lowell.

Samuel Slater and Almy & Brown

Innovations in Spinning

Before the coming of innovations in spinning and weaving, four of the five basic operations involved in the production of cotton goods were traditionally performed by women and, sometimes, children. Only the fifth operation, weaving, was performed by men. Women *picked* out of the cotton the seeds and seed pods that had not been removed in the cotton field. They then *carded* the cotton by brushing it with something that resembled a wire dog brush. Next, they shaped it into a *roving*, or a loose strand of roughly parallel fibers. Finally, they *spun* the cotton into a filament, or yarn. The yarn was then sent to the weavers, who *wove* it into cloth.

The cotton manufacturing process was initially mechanized by a new invention, the "jenny" (a word derived from "engine"), which permitted the production of several strands of cotton yarn simultaneously. The output of the spinner was thereby increased, but the machine still had to be operated by hand power. The quality of output was still so poor that it continued to be necessary to use cotton yarn running in only one direction of the cloth, with linen or wool running in the other direction to provide strength and durability.

The invention that simultaneously improved quality and output was the spinning machine patented by Richard Arkwright in 1769, the same year in which James Watt secured the first patent on his steam engine. Together, the Watt and Arkwright patents were the most important in England in the 18th century. The Arkwright spinning frame was designed to be used with central power, but because of lack of capital, Arkwright's first "central power" had to be a blindfolded horse, led around a rotating shaft in the basement of his mill. By 1771, Arkwright had secured the financial assistance of a merchant named Jedediah Strutt and had built a mill driven by water power.

Arkwright went on to make a fortune for himself. Jedediah Strutt augmented his own estate by manufacturing cotton cloth on license from Arkwright. But it is doubtful whether either man would have made the success he did had it not been for the rotary-motion steam engine put on the market by the firm of Boulton & Watt after 1782. This engine freed the manufacturer from dependence on water power, of which England was short, and made possible the amazing growth of the English cotton textile industry between 1782 and 1800.

Samuel Slater Leaves England for America

One of the employees of Jedediah Strutt was Samuel Slater, who began his career as a clerk at the age of 14 and later became an overseer (foreman). Slater was a persevering, self-contained, blunt young man with an infinite concern for detail. As cotton-mill fever swept through England, he

became convinced that prosperous mill conditions could not continue, and he began to toy with the idea of emigrating to America. Slater believed that a fortune might lie in wait for him across the seas.

In those days it was not easy for a skilled mechanic to leave the homeland. For a century, the British government had been following a restrictive policy wherever there was a threat to England's world supremacy in economic affairs. With the textile machinery revolution, this policy was extended to cover the exportation of any machinery, models, or diagrams. It was also interpreted to prohibit the emigration of trained personnel.

In 1789, the 21-year-old Slater disguised himself as a farm boy and departed by way of London. He intended to be the first person to introduce into the United States the improved textile machinery, with which he had become thoroughly familiar. Upon arriving in New York, Slater made inquiries regarding possible sources of financial support, and was advised to get in touch with the Brown family of Providence. The Browns were wealthy merchants who had interested themselves in cotton manufacture, partly as a speculative investment and partly in response to a wave of patriotic fervor that stimulated the desire to advance the industrial strength of the new republic.

The Firm of Almy & Brown

The four Brown brothers had inherited a fortune made in the wholesaling of English manufactured goods, the exchange of goods with the West Indies (especially Rhode Island and Connecticut tobacco for West Indian molasses), and the trade in African slaves. Moses Brown, the youngest of the brothers, had become involved in cotton manufacture and had experimented with some textile machinery, which proved to be imperfectly made.

In Slater's correspondence with the Browns, he received a letter in which Moses described at some length the unproductive cotton manufacturing experiment with which he had been associated:[1]

> We have two spinning machines . . . one of 32 spindles,[2] the other of 24. They have been worked, and spun about one hundred and fifty skeins[3] of cotton yarn, from 5 to 8 skeins of 15 lays[4] around a reel of 2 yards to the pound; but the person whom we let the mill to, being unacquainted with the business, and the mills probably not perfected, he could not make wages in attending them, and therefore they are at present, still. We then wrought hand roping and the carding machine was not in order. We have since got a jenny, and are putting on fine cards to the machines: these with an eight-four and a sixty spinning jenny, and a doubling and twisting jenny, compose the principal machinery about our manufactory. We have from Ireland a man and his wife who are spinners on the jennies, but we are destitute of a person acquainted with the frames. We shall be glad to be informed what quantity of yarn your mills spin in a day on one spindle. What number of spindles a lad can, or does attend, and at what age? How your roping is made, what fineness, whether twisting harder or softer than for jennies? Whether the cotton is soaped before carding, as that for the jenny, or not at all? What the wooden rollers in the mills are

1. George S. White, *Memoir of Samuel Slater* (Philadelphia, 1836), pp. 64-65.
2. A spindle is a slender tapered rod, probably made of wood or iron at this time, set in vertical position along the side of a ring-spinning frame on which a bobbin (a spool-like device) revolves to receive yarn as it is spun.
3. A skein is a quantity of thread or yarn wound in a coil.
4. As can be seen from the context, a certain number of lays of yarn make up a skein. Thus, a lay is a thinner strand than a skein.

covered with? Ours have been done with calf skin. How the taking up is regulated? Ours is by leather string. On what the spools play and run; on irons?

In January 1790, Slater accepted the invitation of Moses Brown to visit Providence to discuss the manufacture of cotton goods by the English method. Moses was quickly impressed by Slater's obvious command of cotton manufacturing, but the older man knew from experience that the establishment of an operating mill would take considerable time, especially since Slater's "equipment" consisted only of the knowledge he carried in his head. Brown therefore proposed that the mercantile firm of Almy & Brown (consisting of William Almy, a son-in-law of Moses, and Smith Brown, a kinsman) contract with Slater to build a pilot battery of machines—cards, roving machines, and spinning frames.

A new partnership was formed, to be known as Almy, Brown & Slater, and a contract was drawn as of April 5, 1790.[5]

> The following agreement, made between William Almy and Smith Brown of the one part, and Samuel Slater of the other part, Witnesseth that the said parties have mutually agreed to be concerned together in, and carry on, the spinning of cotton by water, (of which the said Samuel professes himself a workman, well skilled in all its branches;) upon the following terms, viz: that the said Almy and Brown, on their part, are to turn in the machinery, which they have already purchased, at the price they cost them, and to furnish materials for the building of two carding machines, viz: a breaker and a finisher; a drawing and roving frame; and to extend the spinning mills, or frames, to one hundred spindles. And the said Samuel, on his part, covenants and engages, to devote his whole time and service, and to exert his skill according to the best of his abilities, and have the same effected in a workmanlike manner, similar to those used in England, for the like purposes. And it is mutually agreed between the said parties, that the said Samuel shall be considered an owner and proprietor in one-half of the machinery aforesaid, and accountable for one-half of the expense that hath arisen, or shall arise, from the building, purchasing, or repairing, of the same, but not to sell, or in any manner dispose of any part, or parcel thereof to any other person or persons, excepting the said Almy and Brown. . . . And it is further agreed, that the said Samuel, as a full and adequate compensation for his whole time and services, both whilst in constructing and making the machinery, and in conducting and executing the spinning, and preparing to spin upon the same, after every expense arising from the business is defrayed, including the usual commissions of two and one-half percent for purchasing of the stock, and four percent for disposing of the yarn, shall receive one half of the profits, which shall be ascertained by settlement from time to time, as occasion may require; and the said Almy and Brown the other half—the said Almy and Brown to be employed in the purchasing of stock, and disposing of the yarn. . . . It is also to be understood, that, whatever is advanced by the said Almy and Brown, either for the said Slater, or to carry on his part of the business, is to be repaid them with interest thereon, for which purpose they are to receive all the yarn that may be made, the one-half of which on their own account, and the other half they are to receive and dispose of, on account of the said Slater, the net proceeds of which they are to credit him, towards their advance, and stocking his part of the works, so that the business may go forward.

5. White, *Slater*, p. 65

In witness whereof, the parties to these presents have interchangeably set their hands, this fifth day of the fourth month, seventeen hundred and ninety.

Wm. Almy
Smith Brown
Samuel Slater

Witnesses-
Oziel Wilkinson, Abraham Wilkinson

Early Years of Almy, Brown & Slater

Slater decided that the old machines were not worth improving. He therefore set about building new machines with capital furnished by Almy & Brown. He would not, however, begin building the Arkwright machine until he had been promised a man to work on wood who should be under bond not to steal the patterns nor disclose the nature of the work. When he had been satisfied on this point, he at once set to work behind closed shutters and drawn blinds to build carding engines, roving frames, and spinning machines.

Slater found that he had settled in a thoroughly Quaker community. His partners were Quakers and so were the Wilkinsons, the family with which he boarded. The Wilkinsons figured prominently from the first. Oziel Wilkinson was a blacksmith, and in his shop made many of the metal parts needed by Slater for his machines. Oziel's son, David Wilkinson, was a clever designer who helped Slater improve on many of his first rough efforts. Soon Slater himself married one of the Wilkinson daughters. Initially, the new machinery was powered by hand. Later, water power was installed. On wintry nights the water wheel frequently froze, and the impatient Slater, irked by delays, sometimes spent two or three hours before breakfast, it is said, breaking the ice.[6] The effects of this exposure are believed to have stayed with him for the rest of his life.

By December 1790, two spinning machines were completed, and Slater was ready to begin commercial production on a small scale.[7] No definite information is available as to the amount of yarn produced or the profits made, if any, but two years later there appeared in the records of Almy & Brown entries that may have been intended to summarize the cotton manufacturing venture to date. If so, it would seem that the scale of operations had been moderate. The first entry is credited to Slater's account and the second is debited.[8]

> Nov. 25, 1792. By the one-half of the proceeds from the sale of yarn spun at the mills, and of credit taken to our account, and accounted for by us as sold—£882 4s 11 1/2d.
>
> To the one-half of our account against spinning mills for machinery, & c. up to Feb. 11, 1792, £252 1 6.
>
> To one-half of do. for stock [raw materials] up to same date, £210 19 1 3/4.

6. Perry Walton, *The Story of Textiles* (Boston, 1925), p. 172-73.
7. The larger of Slater's two original spinning frames is on display at the Smithsonian Institution. The only metal parts are the gears and rollers; the rest is made of wood.
8. White, *Slater*, p. 76

Slater's pilot efforts were regarded as successful, and in 1793 his partners agreed to finance the construction of a mill at Pawtucket Falls on the Blackstone River north of Providence. This mill, handsomely constructed of native stone, later came to be known as the "Old Mill."

The commercial success of the "Old Mill" must have been very satisfying. Not only was it widely imitated, but in at least one year (1803) for which accounts still exist, the amount and rate of the return were considerable.[9]

Labor

The first record of employees begins with Monday, December 20, 1790. During that first week, four boys (Turpin and Charles Arnold, Smith Wilkinson, and Jabez Jenks) were employed full time. On the next Monday (December 27), Eunice Arnold, on Wednesday of the same week Otis Borrows, and on Thursday, John and Sylvanus (Varnus) Jenks commenced work. On the following Monday (January 3), Ann Arnold was added to the list, and during that week, all the nine operatives, seven boys and two girls, worked the full time of six days. The same operatives also continued in the fourth week, though either "Varnus" Jenks or Smith Wilkinson (there is an error in the record which makes this point uncertain) worked only five days, while Turpin Arnold was absent two half-days.

All these workers were children of from seven to twelve, according to Smith Wilkinson, Slater's brother-in-law, who himself began work for Almy, Brown & Slater at the age of ten "by tending the breaker."[10] The family basis of this employment is shown by the fact that among these nine early workers, only four family names were represented. Since Pawtucket at that time was a tiny settlement, it was difficult to secure operatives for the mills, and Slater was obliged to persuade families to move to Pawtucket. The Arnolds, with a dozen children, lived in a lean-to cabin of slabs with a stone chimney. Mrs. Arnold, on being consulted about moving to Pawtucket, stipulated that the family should be provided with as good a house as the one they would be leaving.[11]

Wages ranged from 80 cents to $1.40 per week. There was neither school nor church in Pawtucket, so in 1793 Slater established a Sunday school in his own house for the children working in the mills and for those of the adult employees who had not received an elementary education. At first he taught school himself, but he later hired students from Rhode Island College (now Brown University). Slater attempted to introduce the English apprenticeship system, but it did not suit the American temperament and had to be abandoned.

Raw cotton, before being spun into yarn in the mills, was put out to poor families to be cleaned and whipped at from 4 to 6 cents per pound, the rate depending on the cleanliness of the cotton. The raw cotton was delivered in bags of about 100 pounds each and was carried sometimes for many miles, usually on horseback. This job gave employment to women and children at their homes.[12]

Marketing Through Almy & Brown

9. *Almy & Brown's Account with Spinning Mills*, 1793-1833, Slater Papers, Baker Library, Harvard Business School.

10. William R. Bagnall, *Samuel Slater* (Middletown, Conn., 1890), pp. 44-45; White, *Slater*, p. 99. According to Moses Brown, the work was done by children of from 8 to 14, not a material discrepancy.

11. *Slater Mills at Webster*, 1812-1912 (Worcester, MA., 1912), p.18.

12. *The Two Samuels, Slater and Batchelder, Scrapbook* (Boston, 1791), p. 5.

The firm of Almy, Brown & Slater did no weaving. It produced only yarn and expected that the yarn would be woven into cloth either by the customer or by someone hired by the customer. The firm did not market yarn directly, but turned it over to be sold by the mercantile firm of Almy & Brown. Slater consequently had nothing to do with the sale of goods he produced, beyond ensuring their marketable quality. This complete separation of the production and marketing functions came to be typical of manufacturing enterprises wherever they were established by mercantile interests, and it continued in existence in the United States for nearly a hundred years.

By 1798, as we see in a letter of January 9 to Hussey, Faber & Co.,[13] a Boston firm with a branch in Lynn, the market must have extended at least to Boston. This letter acknowledged receipt of a payment and granted the firm the privilege of selling yarn on credit for commission, accounting with Almy & Brown semiannually. Almy & Brown promised to keep the firm well supplied with yarn and urged that its sale be vigorously promoted. A letter of January 22 to John B. Cockray (address not given in copy) indicates the sending of a consignment of yarn on six-months' settlement. But, wrote Almy & Brown, "being Desirous to spread the use of the yarn We matter not so much as to the punctual payment of the same, unless sold, provided it be in safe Hands."

A letter of March 26, 1798 to William Brown (no address) gives some insight into marketing methods. Brown was informed that "We are free to furnish You with any quantity of yarn you can dispose of either by the Bundle or Pound. Neither do we intend So long as you give us satisfaction to supply any others on your Island with the same to sell on Commissions. But should there be application to Purchase the Yarn of us We expect to sell the same as heretofore."

On May 1, 1798, some cotton yarn "Spun by Water," as they were careful to explain, was sent by Almy & Brown to one Jacob Merritt, who with his brothers had been recommended as "suitable persons to sell the same." It seems likely that Merritt was in New York State, as Almy & Brown wrote that since "this was sent only on Tryal it would be most agreeable to you to sell in on Commissions as several others do in Hutson Albaney & elsewhere." The yarn was charged at the "Retale Price," and Merritt was expected "to sell it at that Price & for us (Almy and Brown) to allow thee a Commission of 5 p. cent for doing the Business for us (after paying) & (for us) to pay all expenses attending the Transportation (&c)." The words in parentheses are crossed out in the original copy.

It is evident that Almy & Brown felt that this yarn was a product not very familiar to the section of the country in which Merritt lived. Consequently, they carefully explained the different grades and how they were sold. "The yarn," they wrote, "is sold Without any Trouble of Weighing, every skain of which haveing been Weighed to 7½ skains to the Pound, in order to make that easy, the Purchaser has his choice either to take 7 or 8 skain, paying for the ½ skain or having it deducted either as is most agreeable." Although the Merritt brothers were strangers to Almy & Brown, still "from recommendation given We hereby entrust you with the yarn," requesting a notification upon its arrival and on the "Prospect of selling the same."

A letter of July 26, 1798, to Benjamin Chamberlain, Philadelphia, expressed regret that no whitened yarn was on hand and instructed him to pay Elijah Waring, their agent at Philadelphia, for the yarn already sold. Another letter of October 7, evidently in reply to a letter of inquiry from Stephen Hoyt of Poughkeepsie, gave the terms under which, in this case, they would allow him to sell

13. The letters quoted in this section are from the Almy & Brown Papers in the Rhode Island Historical Society, Providence.

their yarn, namely at 5 percent commission, Almy & Brown to pay all expenses of transportation, advertising, postage, and so on.

Apparently by this time their yarn was disposed of easily, as is seen in a letter of December 21, 1798, to Hussey, Faber & Co. This letter acknowledged the receipt of a sum of money and an order for yarn but stated that in the future, the commission would be smaller since we "think that 5 per cent on yarn Sold at whole Saile now a considerable quantity is and probably more will be vended, is rather too high a comishons when the Sales of it was only getting introduced we thought we might give that premium, but now we apprehend that two & half per Ct would be as much as is usually given . . . if that would be agreeable to you to receive the yarn at in future, we shall be glad to furnish you with as good an assortment as we can from time to time." Whether or not Almy & Brown made this reduction effective, it is evident that they felt that their yarn had been firmly established.

By 1801, Almy & Brown were selling to storekeepers in Portland, Newburyport, Marblehead, Salem, Boston, New Bedford, Nantucket, and other coastal cities in Massachusetts, as well as to ports along the Rhode Island and Connecticut shores. They were also shipping a large portion of their product to New York City, Albany, Philadelphia, and Baltimore. The quantities sent to each place continued to be small—only Portland, Boston, and Philadelphia took as much as $1,000 worth—yet the market steadily widened. By 1801, some manufacturers were buying yarn from Almy & Brown for the purpose of having it put out to be woven or knitted. For ten years, the firm had enjoyed a near monopoly of machine-made cotton yarn in the United States. Imported English woven goods still dominated the market for quality fabrics, but among those customers who could not afford to buy their cloth ready-made, the cotton yarn marketed by Almy & Brown had to compete only with expensive imported yarn or with low-quality domestic yarn spun by hand or on jennies.

Dissension among the Partners

As production increased, Slater appears to have grown restive under the agreement, which virtually transferred financial control of the cotton manufacturing business to the firm of Almy & Brown. A letter written by Slater's two partners in 1798 indicates that Slater was beginning to feel aggrieved.

> Providence 8th mo. 21 1798
>
> Respected Friend
> Samuel Slater
>
> In my reply to thy suggestions, that we do not pay attention to the settlement of our accts with thee, that a long period of time has elapsed since their commencement, that they lies in a precarious situation—and that thou thinks it high time that they were settled, We say that we have always been ready to make a settlement with thee, at any given time since our accts were opened, that we have repeatedly manifested that readiness—and that we are now also ready to close them whenever thou will attend to it. Whence, therefore, this very extraordinary Paragraph in thy Letter, that on "Monday next, being the 27th Inst. I *will* stop making rovings, so that all the rovings there are on hand may be spun in the course of a few days, in order to weigh off all the yarn, and stock on hand, so that we may complete our settlement." If, indeed, thou means that after that period thou shalt decline having concern in the mill and withdraw thy personal attention from the business, it would be a subject of

consideration and discussion how far that would comport with thy engagements, but if thou means a total stopping and derangement of the business, we now inform thee that we can by no means consent to such a measure. We have not indeed invested in that business our Property and exerted our Credit as Extensively to effect the establishment, and continuance of it, to have it put a period to and made a sacrifice of, whenever it may suit the proposed interest or Will of any Individual. There are a variety of ways and means that they may be devised to ascertain the yarn & stock on hand unattended with such unnecessary derangement & loss.

Upon the whole, notwithstanding the terms in which thine is couched, we must suppose, thou meant it as a proposition merely, which having so fully expressed our disapprobation of, we rest, depending that thou will not fulfill so infamous a measure, as it must eventually prove to thyself as well as to us.

We are respectfully fds
Almy & Brown

Dissension was increased the following year when Obadiah Brown, a son of Moses Brown and a new partner in the firm of Almy, Brown & Slater, announced his intention of joining with friends to promote a new cotton mill in Warwick, a few miles southwest of Providence. Obadiah and his associates wished to equip their mills with Slater-type machinery, but Slater refused them the privilege of hiring his trained machinists to supervise the construction. Nevertheless, Brown insisted on his right to the machinery designs owned by Almy, Brown & Slater and finally exercised the right even at the cost of Slater's friendship.

Slater retaliated in the following year, 1800, by forming a partnership with his father-in-law, Oziel Wilkinson, and his brothers-in-law, Timothy Greene and William Wilkinson, to build and operate the so-called "White Mill" in Rehoboth, Massachusetts. Slater's interest in the new partnership was one-half, Oziel's was one-fourth, and that of the other two one-eighth each. At first Almy & Brown refused Slater permission to erect the mill on a piece of property owned by the Almy, Brown & Slater partnership, but Slater took the matter to court and secured a jury decision to partition the land and the water privileges.

These personal differences did not, however, bring about a dissolution of the Almy, Brown & Slater partnership. By 1806, the partners were planning a joint extension of their manufacturing facilities and the addition to the partnership of Slater's younger bother, John. Slater had induced his brother, who was also a skilled mechanic, to leave England in 1803 and to bring with him as extensive a knowledge of the new manufacturing techniques as he could acquire by visiting the textile-producing centers of the country before his departure for the United States.

The new mill, erected in 1806, was built on a water-power site in northern Rhode Island selected by John Slater. Around the mill was built a company town to which was given the name Slatersville.

Competition

From 1806 to 1812, neither the Browns nor the Slaters added to their mill properties, though the period saw a rapid expansion of Slater-type mills, especially along the Blackstone River north of Pawtucket. The U.S. Government's embargo acts of 1807-1808 effectively prevented the importation of competing English yarns and fabrics and led American promoters to undertake the production of

domestic machine-made cottons in competition with Almy, Brown & Slater. In 1806, there were only 15 cotton mills operating in the United States. By the end of 1809, there are said to have been 62, and 25 more being erected.[14]

Most, if not all, of these mills were built by people who had received their training either directly or indirectly under Samuel Slater. The turnover among Slater's machine builders and repairmen was high, for as soon as a craftsman learned the design and operation of Slater's machines, he was in a position to sell his services as an itinerant machine builder. Some of these men came to specialize in the production of a particular machine and eventually set up shop and went into business for themselves. From this beginning the textile machinery business of southern New England took form.

Marketing was a serious problem for Almy, Brown & Slater in these years of mounting competition. The pioneering work they had done had made their yarn favorably known over a considerable area. The Almy & Brown correspondence with agents in 1803-1804 shows that they were trying to build up a demand for superior quality yarn and to extend their market farther south and west. They were attempting to hold their old customers, but also to add new ones, and particularly to increase direct sales at a discount for cash. Almy & Brown also began to encourage hand weaving and the extension of credit to master weavers.

The federal embargoes brought depression to the commercial ports that had been Almy, Brown & Slater's best customers. In 1808, new marketing devices were adopted in an attempt to revive sales. Almy & Brown ordered their agents to advertise and print handbills announcing the superiority of their yarn. They aggressively sought new customers. They offered extensive credit. They agreed to accept produce of various sorts and tried to exchange their goods for other goods to be sold in their store. They tried to get wholesale agents to sell in small lots. They considered sending out peddlers but feared the difficulty of securing good people. They even tried to maintain a price agreement among manufacturers. At the same time their agents were writing of generous offers made to them by other mills.

A word might be said on price maintenance. Almy & Brown, who had originally set the price, had made it their policy to maintain price. "As we were the first that undertook the business of spinning cotton yarn in this country," they wrote in 1808, "consequently we were the first that made a price for the article, which price has, as far as we have any knowledge, been adhered to by those who are concerned in the business. Should any vary the price, we should be very much obliged by being informed of it, and the quality of their yarn, conceiving a mutual understanding among the makers and vendors of the article would be mutually beneficial."

One way of increasing the demand for yarn was to encourage hand-loom weavers. At this early period we have no information concerning Slater's relations, if any, with the problem of weaving, but the practices of his partners are indicated in their correspondence. In June 1808, they wrote to John Wintringham, a master weaver of Poughkeepsie:

> We are glad to hear that thou are extending thy business by setting more looms up, as we are desirous to encourage the manufacture of the yarn into cloth, by others rather than by ourselves, wishing to promote the industrious mechanic and manufacturer of cloth. We wish thee to increase thy sales to the full extent of the

14. Albert Gallatin, *Report on American Manufactures* (Boston, 1810).

> sales of cloth in the parts of the country where thou lives, having ourselves been obliged to get our yarn wove into blue stripes, etc. in order to sell the same, but if we can sell the yarn to the weaver and be certain of our pay, we shall prefer doing that to manufacturing it ourselves.

It should be noted that the practice of one manufacturer specializing in the spinning of yarn and another in the weaving of cloth was typically English. In the United States, however, textile manufacturers brought the spinning and weaving functions under one management at a very early date. In a letter to John Wintringham, January 17, 1808, Almy & Brown wrote: "We have several hundred pieces now out weaving, but a hundred looms in families will not weave so much cloth as ten at least constantly employed under the immediate supervision of a workman." In order to provide such supervision, Slater and other mill owners moved the weavers and their hand looms into central shops near their spinning establishments.

Rather little effort was made at the Slater mills to produce goods in quantities that bore any very close relationship with market demand. The mills produced and the mercantile firm of Almy & Brown disposed of the output as best it could. On one occasion in the spring of 1809, Almy & Brown had accumulated an inventory of 100,000 pounds of unsold yarn, including a three-year supply of one kind. A common way of disposing of such a surplus was to conduct a large auction sale. For years the New England cotton textile industry, divided as it was with the production function under one management and the sales function under another, continued to produce at a steady pace until the markets had become saturated, whereupon an auction was held, followed by a period of complete demoralization of sales and widespread layoffs at the mills.[15]

Additional Mills—1812 to 1820

By 1812 Samuel Slater probably regarded himself as a wealthy man. Besides his half interest in the highly profitable mill owned by Almy, Brown & Slater, he held a half interest (with his in-laws) in the "White Mill" at Rehoboth, and a quarter interest (with Almy, Brown and his brother John) in the mill at Slatersville.

With the outbreak of the War of 1812, Slater saw the opportunity of extending his financial interests by taking advantage of the period when British imports were shut off from American markets. He therefore directed one of his employees, Bela Tiffany, to make a careful survey of mill sites in the region north of Providence. On Tiffany's recommendation, Slater decided to construct at Oxford, Massachusetts (now Webster), a mill known a the "Green Mill," with Tiffany as a minor partner.

According to a letter written by Slater on February 23, 1814, to Elijah Waring of Philadelphia, the "Green Mill" was expected to produce $100,000 worth of yarn annually, most of which Slater hoped to market in Philadelphia. Evidently, too, there was some talk that Slater wanted to have charge not only of the marketing of yarn from his own mills, but also of that part which was his rightful share in the production of the mill owned by Almy, Brown & Slater. Although nothing seems to have come of this latter proposal, it is evident that the original partners were still not conducting their business on cordial terms.

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15. Much of the above information on marketing comes from Chapter III of Caroline Ware's *The Early New England Cotton Manufacture* (Cambridge, 1931).

Slater's next venture, inspired by the War of 1812, was the establishment in 1815 of a woolen mill, also in Oxford, with an Englishman, Edward Howard, as partner and operating head. The establishment of the second mill at Oxford greatly extended Slater's management responsibilities. Although he could rely on Howard to carry out the day-to-day details, he had to make frequent trips to Oxford to keep in touch with both his cotton and his woolen interests there. In addition, he had the principal management responsibility for the "Old Mill" at Pawtucket, and the "White Mill" at Rehoboth. (The Slatersville mill was under John Slater's management.)

It may have been that Slater was willing to carry this added burden in the thought that his son and namesake would soon be ready to shoulder some of the responsibilities, but in 1818 Samuel Slater, Jr., died. The following year, therefore, Slater sold his interest in the "White Mill" and concentrated his attention on the mills at Providence and Oxford.

After the War of 1812, times were difficult for the young American cotton textile industry. As soon as peace was declared, British merchants dumped on the New York market large quantities of goods that had accumulated during the war. Auctions became common, prices fell, and many poorly financed mills went into bankruptcy. Even some efficient ones shut down for long periods of time.

The 1820s brought a return of prosperity, and Slater began again to add to his mill properties. He had become a wealthy man, although he never achieved the very large fortune typical of Nathan Appleton and the Boston Associates, who developed the new factories at Lowell, Massachusetts (see next reading). By this time so many mills were in operation that it was possible for Slater to expand his operations through purchase rather than new construction. By 1828, all his capital was tied up in manufacturing ventures. In addition, he had endorsed notes to enable his many partners to take full advantage of the booming conditions in the textile industry. Consequently, when a sharp recession took place in that year, accompanied by a tight money market, Slater was nearly driven into bankruptcy.

By 1830, Slater's finances had sufficiently recovered so that he was able to buy the Providence Steam Cotton Mill outright, while he and his brother John were able to retrieve their ownership of the mill at Slatersville by buying out William Almy. Nevertheless, Slater's rather substantial fortune was severely hit by the depression and did not fully recover by the date of his death in 1835. Still, at the time he died, Slater owned:

1. The Providence Steam Cotton Mill (outright).
2. The "Green Mill" at Oxford (outright).
3. The woolen mill at Oxford (in partnership with his sons).
4. The mill at Slatersville (in partnership with brother).
5. The mill at Wilkinsonville (outright).
6. The mill at Amoskeag (one-fifth ownership).

Labor in Slater's Mill

There exists a time book for Slater's mills at Oxford, beginning in 1813 and continuing into 1836, and a book of accounts between Slater and his employees for 1817-1819. Scant though it is, the information contained in the earliest time book, beginning February 1813, does tell us a few things. From the names of the workers, it appears that they were mostly of English ancestry. The names recorded for the first month were Tiffany, Hitchcock, Green, Phettiplace, Holmes, Fuller, Simmons, Munyan, Howland, Johnson, Hill, Cady, Chase, Worsley, Benson, Learned, Reynolds,

Stone, Weave, Wilmoth, and Sheldon. The Christian names showed that the Puritan influence was still at work.

By 1831, a change was coming in the nationality of Slater's workers. Contracts were made with at least five men whose names were typically Irish: Coyle, Ryan, Corcoran, Burns, and Callaghan, the last two signing their names with a cross. In 1833, more workers with typically Celtic names—Mooney, Dentt, Callahan—joined the force. In 1834, came Moore and Davit, both literate. But in 1836, the year after Samuel Slater's death, we find contracts with O'Reille, Burke, Davitt, Doyle, and Kelly, each signed with "his X mark." In 1837 came the first French-Canadians, Peter and Oliver Bargue, both "X" men.

In the total of 36 names listed in February 1813 were only 21 different family names. Five of these family names covered 20 of the workers. Evidently, the workers were made up chiefly of family groups, which probably consisted largely of minor children. It is difficult to ascertain the extent to which parents worked with the children. There were two Willard Howlands in the February list, for example, possibly father and son.

By 1827, when Slater was operating two mills at Oxford, the number of laborers had grown to 144, 79 males and 65 females. Family groups were still as conspicuous as they had been in 1813 and a little over half of the family names included more than 80 percent of the laborers. Evidently minors still made up the bulk of the laborers. There were eight pairs of males possessing the same name, with the addition of "Jr." and "Sr."

The normal working day was 12 hours, as may be seen from the time book for 1813-1836. Wages varied widely. The heads of families signed in acknowledgement of the receipt of the wages of the members of their families and of their own. The wages of men in 1817 seemed to vary around a normal standard of six shillings per day. The shilling then being worth about 17 cents, $1.00 a day seems to have been the most common wage. (The old colonial shilling continued to be used by New England mills in quoting wage scales until well after 1900.)

Many of the women were paid by piecework, but there is no record of how much they could do in a day. Children were apparently always paid by the day, while men in this period were paid by the week. Children received sometimes as little as three shillings a week. Reduced to cents, this could be about 50 cents per week or 6d. (8⅓ cents) for a day of 12 hours. Wages increased steadily with an increase in age, until the highest-paid minor found in this period received 25s.6d. per week or 4s.3d. a day (70 cents), only a little less than the lowest paid adult.

Delay in Adopting the Power Loom

During the years of postwar depression, Slater missed an opportunity that a few competitors seized to their long-range advantage. In England, a loom had been invented that could be driven by water power instead of by hand. The workings of the power loom were brought to America by Francis Cabot Lowell and by a Scots mechanic named Herrocks. But Slater stood firm against the new invention, perhaps because he did not wish to risk the investment during depressed times, but also because he preferred to concentrate on spinning, the part of cotton manufacture which he knew best.

To compete with mills that were offering machine-woven goods along with their yarn output, Slater returned to the practice of subcontracting to domestic weavers in the area adjacent to his mills. As a result, nearly half the families working in the spinning mills had members who at least occasionally did hand-loom weaving. In some cases, children worked in the mill, and the father and

mother—in their spare time or during slack seasons in their ordinary occupations—did hand-loom weaving, assisted perhaps by other children who were not employed in the mill. In hand-loom weaving usually the name of only the family head would appear on the weavers' book, since with him the contract was made, to him the money was paid, and on him lay the overall responsibility for quality control. He might, however, actually do little or none of the work, that being left to his wife and children.

Hand-loom weaving seems to have reached its peak between 1820 and 1825. By 1823, Slater began to install small weaving machines to take the place of the hand weavers. But only in 1827, when anthracite coal from Pennsylvania first became available for industrial purposes, did Slater and his associates build a large mill at Providence. Powered by steam, it integrated weaving with spinning. Only then were Slater and the other southern New England textile producers able to compete with the large integrated mills built first by Francis Cabot Lowell on the Charles River and later by Lowell's associates on the Merrimack River at the new town of Lowell. In the next decades, steam-driven factories in the coastal cities of Providence, Fall River, New Bedford, Boston, Salem and Portsmouth, to which coal could be shipped easily by water, competed successfully with the large water-driven mills on the Merrimack at Lowell, Lawrence, Nashua, and Manchester, on the Connecticut at Holyoke and Chicopee, and on other major New England rivers.

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The Introduction of the Power Loom and Origin of Lowell (by Nathan Appleton, originally published in 1858)

Nathan Appleton (1779-1861) was a prominent Boston merchant, banker, manufacturer, and congressman. As one of the group of investors called the Boston Associates, he developed the New England cotton textile industry, most notably at a new city he and his colleagues named Lowell. The manufacturing system they established there became famous for its vertical integration, efficiency, and industrial relations, featuring a workforce of young women housed in company dormitories. Appleton, who became extremely wealthy, here recounts the story of the founding of Lowell, which grew from a small village in 1820 to the seventh largest city in the United States by 1845.

My connection with the Cotton Manufacture takes date from the year 1811, when I met my friend Mr. Francis C. Lowell, at Edinburgh [Scotland], where he had been passing some time with his family. We had frequent conversations on the subject of the Cotton Manufacture, and he informed me that he had determined, before his return to America, to visit Manchester [England], for the purpose of obtaining all possible information on the subject, with a view to the introduction of the improved manufacture in the United States. I urged him to do so, and promised him my cooperation. He returned in 1813. He and Mr. Patrick T. Jackson, came to me one day on the Boston exchange, and stated that they had determined to establish a Cotton manufactory, that they had purchased a water power in Waltham (Bemis's paper mill), and that they had obtained an act of incorporation, and Mr. Jackson had agreed to give up all other business and take the management of the concern.

The capital authorized by the charter was $400,000, but it was only intended to raise $100,000 until the experiment should be fairly tried. Of this sum, Mr. Lowell and Mr. Jackson, with his brothers, subscribed the greater part. They proposed to me that I should take ten thousand of this subscription. I told them, that theoretically, I thought the business ought to succeed, but all which I have seen of its practical operation was unfavorable; I, however, was willing to take $5,000 of the stock, in order to see the experiment fairly tried, as I knew it would be under the management of Mr. Jackson; and I should make no complaint under these circumstances, if it proved a total loss. My proposition was agreed to, and this was the commencement of my interest in the cotton manufacture.

On the organization of the Company I was chosen one of the Directors, and by constant communication with Messrs. Lowell and Jackson, was familiar with the progress of the concern.

The first measure was to secure the services of Paul Moody of Amesbury, whose skill as a mechanic was well known, and whose success fully justified the choice.

The power loom was at this time being introduced in England, but its construction was kept very secret, and after many failures, public opinion was not favorable to its success. Mr. Lowell had obtained all the information which was practicable about it, and was determined to perfect it himself. He was for some months experimenting at a store in Broad Street, employing a man to turn a crank. It was not until the new building at Waltham was completed, and other machinery was running, that the first loom was ready for trial. Many little matters were to be overcome or adjusted, before it would work perfectly. Mr. Lowell said to me that he did not wish me to see it until it was complete, of which he would give me notice. At length, the time arrived. He invited me to go out with him to see the loom operate. I well recollect the state of admiration and satisfaction with which we sat

by the hour, watching the beautiful movement of this new and wonderful machine, destined as it evidently was, to change the character of all textile industry. This was in the autumn of 1814.

Mr. Lowell's loom was different in several particulars from the English loom, which was afterwards made public. The principal movement was by a cam, revolving with an eccentric motion, which has since given place to the crank motion, now universally used; some other minor improvements have since been introduced, mostly tending to give it increased speed.

The introduction of the power loom made several other changes necessary in the process of weaving. The first was in the dressing, for which Mr. Herrocks of Stockport, had a patent, and of which Mr. Lowell obtained a drawing. On putting it in operation, an essential improvement was made, by which its efficiency was more than doubled. This Waltham dressing machine continues in use, with little change from that time. The stop motion, for winding on the beams for dressing, was original with this company.

The greatest improvement was in the double speeder. The original fly-frame introduced in England, was without any fixed principle for regulating the changing movements necessary in the process of filling a spool. Mr. Lowell undertook to make the numerous mathematical calculations necessary to give accuracy to these complicated movements, which occupied him constantly for more than a week. Mr. Moody carried them into effect by constructing the machinery in conformity. Several trials at law were made under this patent, involving with other questions, one, whether a mathematical calculation could be the subject of a patent. . . .

From the first starting of the first power loom, there was no hesitation or doubt about the success of this manufacture. The full capital of $400,000 was soon filled up and expended. An addition of $200,000 was afterward made. . . .

After the peace in 1815, I formed a new copartnership with Mr. Benjamin C. Ward. I put in the capital for the purpose of importing British goods, with the understanding that I was not to perform any part of the labor of carrying on the business. I was content with a moderate fortune, but not willing to disconnect myself entirely from business. An accidental circumstance occasioned the continuance of this copartnership until 1830.

At the time when the Waltham Company first began to produce cloth, there was but one place in Boston at which domestic goods were sold. This was at a shop in Cornhill kept by Mr. Isaac Bowers, or rather by Mrs. Bowers. As there was at this time only one loom in operation, the quantity accumulating was not very great. However, Mr. Lowell said to me one day that there was one difficulty which he had not apprehended, the goods would not sell. We went together to see Mrs. Bowers. She said everybody praised the goods, and no objection was made to the price, but still they made no sales. I told Mr. Lowell, the next time they sent a parcel of the goods to town, to send them to the store of B.C. War & Co., and I would see what could be done. The article first made at Waltham, was precisely the article of which a large portion of the manufacture of the country has continued to consist; a heavy sheeting of No. 14 yarn, 37 inches wide, 44 picks to the inch, and weighing something less than three yards to the pound.

That it was so well suited to the public demand, was a matter of accident. At that time it was supposed no quantity of cottons could be sold without being bleached and the idea was to imitate the yard wide goods of India, with which the country was then largely supplied. Mr. Lowell informed me that he would be satisfied with twenty-five cents the yard for the goods, although the nominal price was higher. I soon found a purchaser in Mr. Forsaith, an auctioneer, who sold them at auction

at once, at something over thirty cents. We continued to sell them at auction with little variety of the price. This circumstance led to B.C. War & Co. becoming permanently the selling agents. In the first instance I found an interesting and agreeable occupation in paying attention to the sales, and made up the first account with a charge of one percent commission, not as an adequate mercantile commission, but satisfactory under the circumstances. This rate of commission was continued, and finally became the established rate, under the great increase of the manufacture. Thus, what was at the commencement rather unreasonably low, became when the amount of annual sale, concentrated in single houses amounted to millions of dollars, a desirable and profitable business.

Under the influence of the War of 1812, the manufacture of cotton had greatly increased, especially in Rhode Island, but in a very imperfect manner. The effect of the peace of 1815 was ruinous to these manufacturers.

In 1816 a new tariff was to be made. The Rhode Island manufacturers were clamorous for a very high specific duty. Mr. Lowell was at Washington, for a considerable time, during the session of Congress. His views on the tariff were much more moderate, and he finally brought Mr. Lowndes and Mr. Calhoun [the key legislators in Congress] to support the minimum of 6-1/4 cents the square yard, which was carried.

In June 1816, Mr. Lowell invited me to accompany him in making a visit to Rhode Island, with a view of seeing the actual state of the manufacture. I was very happy to accept his proposition. At this time, the success of the power loom, at Waltham, was no longer matter of speculation or opinion: it was a settled fact. We proceeded to Pawtucket. We called on Mr. Wilkinson, the maker of machinery. He took us into his establishment—a large one; all was silent, not a wheel in motion, not a man to be seen. He informed us that there was not a spindle running in Pawtucket, except a few in Slater's old mill, making yarns. All was dead and still. In reply to questions from Mr. Lowell, he stated that during the war, the profits of manufacturing were so great, that the inquiry never was made whether any improvement could be made in machinery, but how soon it would be turned out. We saw several manufacturers; they were all sad and despairing. Mr. Lowell endeavored to assure them that the introduction of the power loom would put a new face upon the manufacture. They were incredulous—it might be so, but they were not disposed to believe it. We proceeded to Providence, and returned by way of Taunton. We saw, at the factory of Mr. Shepherd, an attempt to establish a vertical power loom, which did not promise success.

By degrees, the manufacturers woke up to the fact that the power loom was an instrument which changed the whole character of the manufacture; and that by adopting the other improvements which had been made in machinery, the tariff of 1816 was sufficiently protective.

Mr. Lowell adopted an entirely new arrangement, in order to save labor, in passing from one process to another; and he is unquestionably entitled to the credit of being the first person who arranged all the processes for the conversion of cotton into cloth within the walls of the same building. It is remarkable how few changes have since been made from the arrangements established by him, in the first mill built at Waltham. It is also remarkable, how accurate were his calculations, as to the expense at which goods could be made. He used to say, that the only circumstance which made him distrust his own calculations was that he could bring them to no other result but one which was too favorable to be credible. His calculations, however, did not lead him so far as to imagine that the same goods which were then selling at 30 cents a yard would ever be sold at 6 cents, and without a loss to the manufacture, as has since been done in 1843, when cotton was about 5 or 6 cents a pound. His care was especially devoted to arrangements for the moral character of the operatives employed. He died in 1817, at the early age of 42, beloved and respected by all who knew him. He is entitled

to the credit of having introduced the new system in the cotton manufacture, under which it has grown up so rapidly. For although Messrs. Jackson and Moody were men of unsurpassed talent and energy in their way, it was Mr. Lowell who was the informing soul, which gave direction and form to the whole proceeding.

The introduction of the cotton manufacture in this country, on a large scale, was a new idea. What would be its effect on the character of our population was a matter of deep interest. The operatives in the manufacturing cities of Europe were notoriously of the lowest character for intelligence and morals. The question therefore arose, and was deeply considered, whether this degradation was the result of the peculiar occupation, or of other and distinct causes. We could not perceive why this peculiar description of labor should vary in its effects upon character from all other occupations.

There was little demand for female labor, as household manufacture was superseded by the improvements in machinery. Here was in New England a fund of labor, well educated and virtuous. It was not perceived how a profitable employment has any tendency to deteriorate the character. The most efficient guards were adopted in establishing boarding houses, at the cost of the Company, under the charge of respectable women, with every provision for religious worship. Under these circumstances, the daughters of respectable farmers were readily induced to come into these mills for a temporary period.

The contrast in the character of our manufacturing population compared with that of Europe has been the admiration of the most intelligent strangers who have visited us. The effect has been to more than double the wages of that description of labor from what they were before the introduction of this manufacture. This had been, in some measure, counteracted for the last few years, by the free trade policy of the government; a policy which fully carried out, will reduce the value of labor with us, to an equality with that of Europe.

The following are the changes in the price of the article first manufactured at Waltham:

1816	30 cents per yard	1829	8-1/2 cents per yard
1819	21 cents per yard	1843	6-1/2 cents per yard
1826	13 cents per yard		

From that time, the price has fluctuated with the price of cotton, from 7 to 9 cents per yard.

The Origin of Lowell

The success of the Waltham Company made me desirous of extending my interest in the same direction. I was of opinion, that the time had arrived, when the manufacture and printing of calicoes might be successfully introduced into this country. In this opinion, Mr. Jackson coincided and we set about discovering a suitable water power. . . .

I was at Waltham one day, when I was informed that Mr. Moody had lately been at Salisbury, when Mr. Ezra Worthen, his former partner, said to him, "I hear Messrs. Jackson and Appleton are looking out for water power. Why don't they buy up the Pawtucket [Massachusetts, not Rhode Island] Canal? That would give them the whole power of the Merrimack [river] with a fall of over thirty feet". . . . Mr. Jackson soon after called on me and informed me that he had had a correspondence with Mr. Thomas M. Clark, of Newburyport, the Agent of the Pawtucket Canal Company, and had ascertained that the stock of that Company, and the lands necessary for using the water power, could

be purchased at a reasonable rate, and asked me what I thought of taking hold of it. He stated that his engagement at Waltham would not permit him to take the management of a new Company, but he mentioned Mr. Kirk Boott as having expressed a wish to take the management of an active manufacturing concern, and that he had confidence in his possessing the proper talent for it. After a consultation, it was agreed that he should consult Mr. Boott, and that if he would join us we would go on with it. He went at once to see Mr. Boott, and soon returned to inform me that he entered heartily into the projects; and we immediately set about making the purchases. Until these were made, it was necessary to confine all knowledge of the project to our own three bosoms. Mr. Clark was employed to purchase the necessary lands, and such shares in the Canal as were within his reach, whilst Mr. Henry Andrews was employed in purchasing up the shares owned in Boston. . . .

Our first visit to the spot was in the month of November, 1821, and a slight snow covered the ground. The party consisted of Patrick T. Jackson, Kirk Boott, Warren Dutton, Paul Moody, John W. Boott and myself. We perambulated the grounds, and scanned the capabilities of the place, and the remark was made that some of us might live to see the place contain 20,000 inhabitants. At that time there were, I think, less than a dozen houses on what now constitutes the city of Lowell, or rather the thickly settled parts of it. . . .

[Appleton then lists the articles which incorporated the company, with a capital stock of $600,000 to be allocated in this manner:]

Kirk Boott, Ninety Shares,	90
John W. Boott, Ninety Shares	90
N. Appleton, One hundred and eighty Shares,	180
P.T. Jackson, One hundred and eighty Shares,	180
Paul Moody, Sixty Shares,	60
	600

An Act of Incorporation was granted 5th February, 1822. . . .

The Pawtucket Canal belonged to a Company incorporated in 1792, by the name of "the Proprietors of the Locks and Canals on Merrimack River," apparently established originally with the view of making the Merrimack River navigable to Newburyport. This object was, in a great measure, defeated by the incorporation in 1793 of the Middlesex Canal, opening a direct communication with Boston. A canal, of very moderate dimensions was, however, made around Pawtucket Falls, for the passage of rafts of wood and lumber. The income, up to 1820, hardly averaged 3-1/2 per cent per annum, which made the purchase of the stock an easy matter. It consisted of 600 shares, on which $100 had been paid, each.

The enlargement of this canal, and the renewal of the locks, was the first and most important measure to be accomplished by the new Company. It was decided to make it 60 feet wide and 8 feet deep, which, it was estimated, would furnish 50 mill powers. This was commenced with the opening Spring of 1822, and prosecuted with the utmost vigor; but it was soon ascertained that it could not be accomplished in the manner proposed, in one season. Its cost was upwards of $120,000.

It was decided to place the mills of the Merrimack Company where they would use the whole fall of thirty feet. Mr. Moody said he had a fancy for large wheels. In the meantime, a new canal was to be made to the Merrimack River, mills were to be built, a house for Mr. Boott, and boarding houses for the operatives. A contract was made with the Boston Manufacturing Company, or Waltham Company, for machinery for two mills. As it was all important to the Merrimack Company

to have the use of the patents of the Waltham Company, and especially to secure the services of Mr. Moody, it was finally arranged to equalise the interest of all the stockholders in both companies, by mutual transfers, at rates agreed upon, so that there was no clashing of interest in any case. This could only be done by a strong feeling of mutual interest in favor of the measure, and a liberal spirit of compromise in carrying it out. Under this arrangement, it was agreed, in August 1823, to pay the Waltham Company $75,000 for all their patterns and patent rights, and to release Mr. Moody from his contract in their service.

In December, 1822, Messrs. Jackson and Boott were appointed a committee to build a suitable church; and in April 1824, it was voted that it should be built of stone, not to exceed a cost of $9,000. This was called St. Anne's church, in which Mr. Boott, being himself an Episcopalian, was desirous of trying to experiment whether that service could be sustained. It was dedicated by Bishop Griswold, but the Directors of the Merrimack Company never intended to divest themselves of the control of it. Liberal grants of land were made for other places of worship, and subscriptions freely made by the stockholders for different religious societies.

The first wheel of the Merrimack Company was set in motion on the first of September, 1823. In 1825, $500 were appropriated for a Library. Three additional mills were built. In 1829, Mr. Dutton, going to Europe, Nathan Appleton was appointed President. The first dividend of $100 per share was made in 1825. They have been regularly continued, with few exceptions, averaging something over 12 per cent per annum, to the present time.

The business of printing calicoes was wholly new in this country. . . . The then recent improvements in printing were of the highest importance. The old process of printing by blocks of wood was in a great measure superseded by the cylinder. The introduction of machines, carrying one or more cylinders, each distributing a different color, was in printing what the invention of Arkwright was in spinning, the source of immense fortunes. Amongst those who availed themselves of it, one of the earliest was the father of the late Sir Robert Peel, who acquired enormous wealth as a printer. It is related of him, that on his London bankers hinting that he was using his credit too freely, he quieted their scruples by revealing to them his secret, that he was coining a guinea on every piece of calico which he printed.

The engraving of these cylinders was the most important part of the process, and Mr. Boott made one voyage to England solely for the purpose of engaging engravers. The art was then kept a very close mystery, and all exportation of machinery was prohibited. Dr. Samuel L. Dana was employed as chemist, and through the superior skill and talent of Messrs. Boott, Prince and Dana, the Company was brought to the highest degree of success.

In 1828 an arrangement was made by which Mr. J.W. Paige came into the selling agency on the retirement of Mr. Ward from the firm; and it is not too much to say, that to his skill and good judgment, the Company is greatly indebted for its success. This office combined with it the preparation of the pattern under a regular designer, and carried with it a commission of 1-1/4 per cent. . . .

The first printing cloths were made 30 inches wide in the grey, giving them when printed a width of 27 inches, being about two inches above the average of British prints. None other than fast colors were used, whilst a superior durability from the throstle over mule spinning, combined to give them a higher character than attached to any other goods. In the mean time, Mr. Moody was transferred from Waltham to this place, having charge of the manufacture of machinery in the building

erected for that purpose. Mr. Worthen had been employed at an early day. He was a man of superior mechanical genius, and his death, in 1817, was deeply regretted.

At the annual meeting at Chelmsford, May 21, 1823, the Directors were authorised to petition for an increase of capital to $1,200,000 and on the 19th of October, 1824, a new subscription of 600 shares was voted, and a committee appointed to consider the expediency of organizing the Canal Company, by selling them all the land and water power not required by the Merrimack Manufacturing Company. This committee reported on the 28th February, 1825, in favor of the measure, which was adopted; and at the same time a subscription was opened, by which 1,200 shares in the Locks and Canals were allotted to the holders of that number of shares in the Merrimack Company, share for share.

The Locks and Canals were thus the owners of all the land and water power in Lowell. They made the necessary new canals to bring it into use. The first sale was to the Hamilton Manufacturing Company, in 1825, with a capital of $600,000, and afterwards increased to $1,200,000. . . . The Appleton Company and the Lowell Company followed, in 1828. In 1829 a violent commercial revulsion took place both in Europe and this country. It was especially felt by the cotton manufacturers in England, and several establishments in this country operating with insufficient capital, were prostrated. The Merrimack Manufacturing Company made no dividend that year. During this period of depression, Messrs. Amos and Abbot Lawrence were induced, by some tempting reduction in the terms made by the Proprietors of the Locks and Canals, to enter largely into the business, the consequence of which was the establishment of the Suffolk, Tremont and Lawrence Companies, in 1830. The Boott followed in 1835, the Massachusetts in 1839. These Companies involved capital amounting to $12 million. They are all joint stock companies,[16] with a treasurer as the responsible agent, and a superintendent or manager of the mills. The principle on which these corporations have been established, has always been, the filling of these important offices with men of the highest character and talent which could be obtained. It has been thought, as has been found to be, the best economy, to pay such salaries as will command the entire services of such men. The Directors properly consist of stockholders most largely interested in the management of their property. They receive nothing for their services. A very important part also depends on the selling agents, who should be well acquainted with the principles of trade. The success of the establishments at Lowell, may be fairly quoted in favor of the system pursued. It is true that during the present revulsion [the depression of the late 1850s], the most severe within the memory of the oldest merchant, there is a disposition to attribute the depression of the cotton manufacture to the construction of these companies. It is always easy in such a time to find some new ground of cavil. Corporations, like individuals, will succeed or fail, as they are directed by skill and intelligence, or without them.

The prices of Merrimack prints have varied as follows:

The average price per yard in	1825	was —	23.07 cents.
" " " " " "	1830	"	16.36 "
" " " " " "	1835	"	16.04 "
" " " " " "	1840	"	12.09 "
" " " " " "	1845	"	10.90 "
" " " " " "	1850	"	9.24 "
" " " " " "	1855	"	9.15 "

16. A joint stock company is an organization the capital of which has been divided into transferable shares among its members who, however, have the personal liability of partners for the debts of the concern.

The prices of Merrimack prints have varied as follows:

The	average	price	per	yard	in	1825	was —	23.07	cents.
"	"	"	"	"	"	1830	"	16.36	"
"	"	"	"	"	"	1835	"	16.04	"
"	"	"	"	"	"	1840	"	12.09	"
"	"	"	"	"	"	1845	"	10.90	"
"	"	"	"	"	"	1850	"	9.24	"
"	"	"	"	"	"	1855	"	9.15	"

Exhibit 1 Population of Lowell, Massachusetts

1820	200
1836	17,633
1845	over 30,000

Exhibit 2 Average Capitalization of Textile Mills in Lowell, 1837

Type of Mill	Number	Total Capital	Average Capital
Cotton	23	$6,167,000	$280,318
Printing	3	700,000	233,333
Woolen	5	580,000	116,000

Sources: From John P. Bigelow, *Statistical Tables: Exhibiting the Condition and Products of Certain Branches of Industry in Massachusetts, for the Year Ending April 1, 1837* (Boston, 1838), pp. 31, 105; Robert F. Dalzell, Jr., *Enterprising Elite: The Boston Associates and the World They Made* (Cambridge, Mass.: Harvard University Press, 1987), p. 70.

Exhibit 3 Profits and Dividends of Eleven Textile Companies, 1838-1846

Year	Profits (percent of net worth)	Dividends (percent of paid-in capital)
1838	3.7%	0%
1839	14.1	8.03
1840	4.2	7.45
1841	7.9	7.36
1842	3.2	8.50
1843	2.3	2.89
1844	19.1	12.20
1845	17.1	16.99
1846	18.2	22.32

Source: Paul F. McGouldrick, *New England Textiles in the Nineteenth Century: Profits and Investment* (Cambridge, Mass.: Harvard University Press, 1968), pp. 81, 251, cited in Dalzell, *Enterprising Elite*, p. 52.

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3
WHARTON REPROGRAPHICS

Work: Craft and Factory in Nineteenth-Century America

The following readings are drawn from nineteenth-century documents. They describe the work experiences of an itinerant craftsman and of New England textile-mill operatives. Following these original descriptions is an exhibit that presents pay scales for segments of the American work force during the nineteenth century.

* * * * *

DOCUMENT #1 *Memoirs of an Itinerant Worker*

The following article was written by Samuel Clough (1824-1905) between the years of 1898 and 1901. Original punctuation, spelling and grammatical construction have been retained for the most part.

Source: *Annals of Iowa*, Ser. 3, 39 (Spring 1969), pp. 604-19.

At home, Union Co. Iowa
Post Office, Ellston, Iowa
December 19, 1898

I, Samuel Clough, sit down at the age of 74 to write a few past incidents and memoirs of my life, works, and travels.

My father's name was Samuel, his father's name was Jobe Clough. My mother's name was Hannah Clough, her father's name was John Philbrick.

I was born April 26, 1824 on the farm my father was born on, in the town of Alma, Lincoln Co., State of Maine.

Professors James P. Baughman, Alfred D. Chandler, Jr., and Thomas K. McCraw prepared this note as the basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation.

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After I was of school age I went to school in summer time for a few weeks until I was 9 years old, when I quit summer school and went to winter school about 2 months in the year until I was 19 years old. When I was 9 years old I began to plow on my fathers farm. I could hold the plow and drive oxen. From then on my principal education consisted in learning how to work the little farm until December 1 before I was 20 years old. December 8, 1843, when I shipped on board the ship Ontario. Captain Bearstow from Wiscassett to New Orleans, as a green hand before the mast for 8 dollars per month.

Out of that I paid 20 cents per month tax support the Marine Hospital leaving savings of $7.80 as wages. The ship arrived in New Orleans about the third of January 1844 after a rather pleasant trip. The ship laid there idle until the next summer, as I understood afterward. I stayed with the ship until about the 20th of April. I had received one month pay in advance to fit me with some clothing which I needed, but I got but little money after that. When I left the ship there were some 20 dollars due me, but I could get none and I had no shoes, and I owed one dollar to a man who a few weeks before had loaned me a dollar to pull a bad tooth with which I had suffered with for several weeks.

It had been getting rather dull staying in New Orleans and warm weather coming on and I wanted to be learning Seamanship, so I thought I would find another ship and go to sea again. Freighters were low, times on the sailors were rather hard, wages were low. The only chance I could find was to go to Liverpool in England in the ship Laura. Captain Show of Bucksport, Maine, for $7.80 a month, and had to agree to go without any pay in advance. Now I was going to Liverpool, had no shoes was owing a friend a dollar, but had not so much as one red cent. I had been bare foot for two months, but it was not very cold in that latitude even in February and March but I expected to get up North where I might see ice burgs in April. I expected to get money of Captain Bearstow until within six hours of the time appointed for the ship Laura to sail. I worked on the ship Laura three days before she was to sail in the evening, about two hours before she was to sail I went to the Captain and told him I wanted one dollar, and if he would let me have two dollars I would be very glad. He put his hand in his pocket and pulled out one dollar and fifty cents and says here take that in such a gruff tone that I dare not say more. So I took it and marched off. I could not pay the dollar and buy the shoes with that, so I decided to go and pay the dollar and went to Europe totally barefoot for want of a dollar to buy a pair of shoes.

It was pretty cold part of the way across the Atlantic Ocean, but I lived through it and quite nicely. That is the last time I was out of money. When I got to Liverpool the first thing I bought was a good pair of English shoes made to order. They done me more service than any other shoes I ever had. They cost me $2.50. The ship carried cotton and was 43 days on the passage. I remained with the ship until she discharged her cargo of cotton and took a general cargo for Boston, Massachusetts, where she arrived about September 12 as near as I remember.

September 19, 1844, I began to work for the Boston and Maine Railroad Company for Seven and six-pence a day, $1.25, and took board of Clark Durgan on the corner of Canall and Causway Street at $2.50 per week. I continued to work for the R.R. Company until about the first of January, 1845.

Sometime in January, 1845 say about the 10 I went out to the pond and worked for Luther Weith, some six miles from Boston, cutting ice for $1.00 per day at first, but soon he advanced my wages to $1.50 and gave me charge of part of the work. I worked there during the ice season until about the middle of March when I went into Boston. While cutting ice I boarded with a shoemaker and farmer in the neighborhood whose daughter kept house for him.

About the first of April 1845 I began to work for Jeremiah Wetherby and Company to learn to cut stone in Boston, Massachusetts. I worked the first three months for my board that is they paid the price of my board $2.75 per week, at Mr. Burgans. The next three months they paid me $10.00 a month and board, that completed my apprenticeship. From that on until I took this Variloid, they paid me $1.42 per day and I paid my own board. The smallpox got into my boarding house from which I took the Veriloid and was sick about a week. When I got well I went to Methuen and began to work February 13, 1846, to cut stone for John A. Carpenter and Company to build a dam across the Merimac River at Methuen to make water power for manufacturing purposes. I cut some of the first stone put in the dam. I got $1.50 per day all winter, the highest wages paid for cutting stone for the winter.

The stone was quarried and cut in Pellham, New Hampshire, about 7 miles from where the dam was built. The stone was drawn with oxen and horses on wagons. Some sleds were used in the winter. Since that time a very large city had been built called Lawrence.

About April 3, 1847, I went back to Boston and the 9 of April went to work for Wetherby again for $1.75 per day to cut stone. Sometime after this Wetherbys got a portion of the stone work for the Reservoir on Beacon Hill in Boston. He wanted me to go to Cape Ann where the stones was quarried and some of them were cut for his custom in Boston and other towns around, for they done a large business in stone work. They were to pay me $2.00 per day to go to the Cape to cut stone for the Reservoir, and when I got there, Mr. Clifford the foreman and partner thought I could not earn 2 dollars a day as I was only an Apprentice the season before and said he would give me 4 cents per foot and up special measure for cutting bed and build work as it is called. So as by this time I had found out that I was no slouch of a stone cutter. I concluded to take it and went to work, and in about 3 weeks he found out I was making $3.00 a day. Then he wanted me to cut some Cornist stone for a depot. Said he would give $1.75 per foot in length so I cut cornist along side of his old friend.

Flood an old hand, who had worked for the firm several years and was counted an extra hand and was working for 3 dollars a day. Messers Clifford and Flood watched me pretty close until they found I was making $5.00 per day. Flood was mad and Clifford went back on the price and that knocked me out of a job for I would not work for them any more. I demanded a settlement picked up my tools and went to Leadbeaters Island in Penobscot Bay in the State of Maine, and work for Mr. (I have forgotten the name) who was getting out stone to go to Key West in the Gulf of Mexico for a port. I cut by the port and made $3.00 a day until fall. About November 1, 1847 the Brigg Lucy Wotts, Captain Watly of St. George Maine come to the Island to load with stone for Tay Webb and she wanted a man to go as a sailor. I shiped and went to Key West thence to New Orleans was 33 days on the passage and received $17.95 including unloading at Key West. December 16, 1846 Took board at Mrs. Smith's at $3.50 per week. The 17 began to work for Clark Day and Stoupper for $1.25 per day. They kept a large store of Hardware consisting of iron, tin, lead, farm implements, mechanical tools, oils, boat mill stones, grindstone portable mills, etc. January 8, 1847 began to board with A. Ruth on Jefferson St. New Orleans at $12.00 per month February 14 began to board at Mrs. Hogdens Poidras Street for $3.00 per week. Sold to Mr. Beain of Buffalo, New York, a pair of calfskin boots for $3.50 he paid me $2.00 and that was all I got. He soon went to Buffalo, New York. About April 10, 1847 began to board with Mrs. Verrieges, Phillips St. New Orleans at $3.50 per week. I worked for Clark Day, Stamper and Co. until January 1 when I had $40.00 per month the first of November 1847, then $50.00 per month and I was to have $50.00 a month until January 1, 1848. Then I was to have such wages as they paid their other help which was then about $75.00 per month. But in the Spring of 1847 my father died and it seemed necessary that I should go home to take care of the little farm and my mother, who lived on it at the time. Perhaps I should say here that

my fathers farm and home sold under mortgage after I went to sea, and the next spring while I was in Boston learning to cut stone Elbridge Peasley a neighbor of ours in Alma Maine was up to Boston and he called on me and said my fathers farm was sold and nearly past redemption and that if I could redeem it, it would help them. I was a little past 21 years of age but had no money. But my sister Eliza had been working in Boston for a number of years making boots and had 4 or 500 dollars in the Savings Bank, she said she would loan me some money if I could use it to save the place. So I went home and found I could buy the home part of the farm containing the buildings, and the best part of the land by paying $100 dollard down and the ballance of the debt against it in a year or so. I went back to Boston, borrowed $100 of Eliza and back to Maine and made the agreements and saved the place, and soon after I finished my trade I began to earn money and paid all the debts off. My father lived on it while he lived, and Mother used it as long as she wanted it free of rent and after that I sold it to Brother Albert.

Sometime in April 1847 Massers Clark Day Stampper and Co. allowed me to go home and paid me up according to our contract so far and kindly sent their team to take my chest and baggage to the ship without charge. When I left for Boston. To save traveling expenses I looked for and found a ship loading for Boston. I said to the Captain that I wanted to go to Boston with him. I would like to work my passage. He said I might go, so I went on board and turned to the same as any sailor and did not expect any wages. But when the Captain paid off his men he paid me as much as any of them, which was $14.00 per month. We were just one month on board. From Boston I went to Maine where I arrived about the first of June as near as I remember.

My brother Albert had planted some corn and some potatoes, and he had gone to Gardiner to learn the carpenter trade and so I hoed the corn and potatoes and cut the hay and shingled the house and made some other repairs and provided for Mother harvested the corn and potatoes for her and left her what hay she wanted for her little stock, and employed Uncle Daniel Clough to bale some of the hay and sell it and rented him the hay ground for the next year and in the fall I went to New Orleans again by way of Boston, Albany, Buffalo, Sandusky, Cincinnata, Memphis and on down the Mississippi River. Arrived in New Orleans. Found work in a Whole Sale and Real Estate Drug Store. Soon after the Cholera broke out in New Orleans. I was boarding at Mrs. Smiths and my room mate died with the cholera in about 2 hours after he was taken sick. In a few weeks after that I left New Orleans and come up the Mississippi and Ohio Rivers to Cincinnatti by steam boat on the way up there were 8 deaths on board the boat by cholera and one death by drowning before we reached the mouth of the Ohio River. I think that was the beginning of the year of 1849. The great cholera year. I was sick in New Orleans with the symptoms of cholera and thought it best to leave there. I did not find employment in Cincinnata so I went North to Sandusky City. By this time I had got nearly out of money and was obliged to hunt work. I soon fell into cutting ice for Mr. Roosevelt who had just received a lot of tools for cutting ice of Mr. Wyeth of Mass. whom I had worked for cutting ice on fresh pond 6 miles back of Boston a few years before. Mr. Roosevelt had never used those tools before and needed some expert help to cut his ice. I had used the tools and he was glad to have my help and I was glad to get the job. I worked at cutting ice and cribbing until I got money to go to Cleaveland Ohio by stage. I was intending to make my way back to Boston with a view of working at my trade cutting stone again. At Cleveland I found work with the Cleaveland, Columbus and Cincinnatti Railroad Co. who had began to build their R.R. the fall before. I got $25.00 a month helping the Engineers to stake out the line and set grade stakes. I worked there until navagation opened when I took the first boat to Buffalo, New York and thence to Albany by rail. When at Albany I thought I would like to see New York City as I had never been there so I took one of Vanderbilts fine Steamers and run down to New York. The passage cost only 12½ cents or a york shilling as it was called in those days. The United States had began to build a dry dock and engine

house of Maine granite in the Navy yard in Brooklin. I applied for work as a stone cutter. They put me to work on trial week and then gave me work at $2.00 per day of 10 hours and I worked all summer. This was in 1849. I had a very pleasant time that summer good wages, nice job in a nice city, good boarding house with Mr. William Bovis and family, corner of Hudson Ave. and High street. They were a pleasant family to board with. The dry dock was a very nice job of fine cut granite and so was the engine house. There were at one time in the summer when there was near 200 stone cutters at work, and there was a rule that if a man made a mistake in cutting a stone he would be suspended from work for a day or more. I was one of the very few who was not suspended during the seven months I worked there. I was one of the last four stone cutters that was discharged when cold weather come on and the work was stopped for the winter.

While in Brooklin I bought unseen 600 acres of land in Tennessee. December 17, 1849 I started to go and see it. I took maps and charts to sell on the way. I took the cars from New York to Reading Penn. There I began to sell maps and travel on foot in the direction of Cumberland, Md. Thomas Jones a stone cutter went with me as far as Cumberland. We bought maps and charts published by Ensign and Thayer, No. 50 Ann Street, New York. I took $25.25 worth about what I could carry and sold them before I got to Cumberland. I made about $1.00 a day and expenses. Thomas Jones got tired and went back to New York. At Cumberland I fell in with an Englishman and his son. We then footed it over the Allegania Mts. to Brownsville on the Monangahela River, where we took deck passage on a boat down the Monongahala and the Ohio rivers to the mouth of the Cumberland river where my English fellow travelers and I parted company. They went on to St. Louis and I took another boat and went up the Cumberland River to Nashville Tennessee. Here I stopped to see if the land I had bought had been recorded. I found the lands had been deeded by the State to parties who had sold them in New York and deeds recorded all right, so I pushed West on foot some 60 miles to the East Bank of the Tennessee River where my land was supposed to lay. My journey West from Nashville was through a very sparcely settled country for more than 2/3 of the way and many streams to ford. One stream was nearly up to my neck. I took off my clothes and tied them into a bundle and tied them to my valice and held them on my head and waded across. On arriving in the district where my land should have been and on inquiring I found my purchase was a perfect swindle. I came about on this wise. When as the state had sold all the land on a certain District lying on the East side of the Tennessee River that would sell for a very small price it passed a law to grant to any one who would pay the expenses of entering and surveying the remnants of land not sold (and that was a very small part of the land district) it appeared that the then entry taker and the then County Surveyor worked up a plan to make partition entry takers book and in the surveyors book and got deeds for them from the State and they were recorded in the State Capital and the old Quaker of whom I bought in New York told me afterwards that 18,000 acres of those lands had been sold in New York in one winter and the citizens in Tennessee told me that large lots of those Tille had been sold in the large cities in Europe. Those petition entries were located largely on the East Bank of the Tennessee River, where the land was supposed to be good. In 5,000 acre tracts along the bank of the river they were located eleven entrys deep on top of the other. I found this out by refering to the County surveyors book which I had access to 2 weeks when I was there. The former Entry taker had died and the county surveyor had left the county, who had done this work. In order to find where my 600 acres was located I had to begin according to the survey at a point just below. Forms Creek on the East Bank of the Tennessee River. Well after finding out how easily and how badly I had been swindled I concluded to pocket the loss and go back to New York. So I sold most of my spare clothing, my valice to help pay expenses and lighten my load and walked back to Nashville. There was one stretch of woods and hills and valleys, 12 miles between houses on the way. I am writing this from memory mostly. It is Feb. 1, 1900 and the things I am writing about today happened in the winter of 1849 and 1850 according to an occasional date furnished by some old papers that I had kept.

In 50 years I find I have forgotten many things, places, and names which I would like to recall. There are some things that may seem trifling to others that I will put in here because my life had been made up of little lessons and I will relate one of them here. When I got back to Nashville, I was having a very bad cold and sore mouth, my mouth was so sore I could not eat much for several days and I think it was caused in this way. When my English comrad, before mentioned and I had taken deck passage on boat down the river from Brownsville we needed to provide our selves with something to eat on the way. We thought to join in buying provisions and cooking utensils and board together. They wanted to buy coffee pot and dishes, frying pans etc. I though we had better buy cooked food and do without cooking. They couldn't see how to get along without coffee. I said we could live very well for 5 or 6 days on water I finally said I could do without any drink and I concluded to try the experiment so I lived on dry food, such as bread, cheese, smoked fish, etc. without a drop of fluid of any kind for 6 days and I felt on great inconvienience for the time for the want of drink, but I believe it was the cause of my sore mouth a week or two after I rested in Nashville about a week then took deck passage again down the Cumberland river and up to Ohio to Cincinnatta where I bought some maps and sold around Cincinnatta until I could order some maps and charts from New York, which I received in a few weeks. Then I went up the Ohio River to Bordersville in Virginia where I began to walk toward New York and sell maps on the way. I think it was in March 1850 I put in the following summer selling maps through Virginia, Maryland, Deleware, Penn., New York, New Jersey, and arrived in New York about the beginning of October following as near as I can remember. I sizzaged all the way on foot to within 50 miles of New York City. I struck on my way the Kanacoha River Charlestown the Hawks Nest, Greenbria Co. the Natural Bridge, Lexington, Stanton, Harrisburg, Wood Stock, Winchester, Charleston, Harpers Ferry, Lauden Company, Faerpox Co., Mt. Vernon in Virginia, Baltimore, Philadelphia, New York. A good way to find out how large a state is is to walk over it. It was pretty hard work to sell maps on foot from house to house but I enjoyed the trip very much. I enjoyed the scenery of the country and I liked the people who were generally kind and hospitable. I made my journey and made fair wages and it was a good experience, although my land purchase and land hunt was a failure.

After getting back to New York I called on Arnold Buffern and Co., ll Park Row, New York, and told him what I found out about my Tenn. land and he paid me back $50.00 of the $75.00 which I paid down and we played quit. Having had success in selling maps I concluded continuing in the business and also concluded to invite my brother Albert to join me in Providence R.I. and we go South and sell. In the meantime I took out maps and went up the Hudson River to Vermont and across the state East by way of Mt. Tabor and Wood Stock to the New Hampshire line all on foot. Then I took the cars for Providence where I met Albert. Thence we went to New York and took out maps and went South into New Jersey and began to sell. After this our cousin Samuel Sevey came out and joined us in the business and we distributed maps, charts, and pictures through the country about Philadelphia, Baltimore, Washington, Northern Virginia, and Maryland. Sevey worked with us some 2 or 3 months then went back to Boston. Albert worked with me some 8 or 9 months and concluded to buy the little farm of me for which he paid me $400 and he went back to Maine and went to farming. I con- tinued map selling until the spring of 1852 when I concluded to go to Iowa by the way of Cumberland and Cincinnata, St. Louis and landed in Keokuk, Iowa, in June 1852. I walked from Keokuk to Fairfield where the United States land Office was. In the next winter I bought 240 acres adjoining my other land. I entered my first land in Henry Co. I think in July 1852. I then looked about the county and sold maps a few weeks, went up to Muscatine from there I went down the Mississippi River by steam boat to Burlington. By this time I had made up my mind to go to work on my land so I ordered a cart made to be used with oxen on the farm. I bought a sythe a rake and pitch fork and walked back to my land and carried my tools about 30 miles and began to mow some hay as I was intending to buy some young cattle which I did the next winter. I paid $6.00 a head for

some pretty good spring calves 11 head from Mr. George Ramsey, East of London. I bought other young cattle until I had about 36 head before spring and fed them on the hay I put up. I boarded with James Marting about 2 and ½ miles North of my place. This was the nearest house to my place. Mr. Samuel Andrews lived the next nearest about 3 miles North Westerly. The nearest house on the East was Carson and the Jervises about 5 miles along the Virginia Grove. The nearest house South was Mr. Barter about 6 miles. The village of New London was nearly 11 miles South. Mt. Pleasant about 15 miles South West. Mr. Syp was the nearest neighbor in that direction about 10 miles from my place.

This was situated in a beautiful gentle rolling prairie no timber within 5 miles but about 200 acres on Crooked Creek about 1½ miles from where I built my first house, Virginia Grove on the North East 5 miles in sight. All else was prairie grass, thousands of tons of it. How I loved to mow it down, dry it and stack it.

There is a great many things and happenings pleasure and pains all along journeys through life I would like to write about but time will not permit and I will have to content myself with the mention of a very few. I have been very industrious and saving. I was determined to make a home and save some property and have a farm before I married. I have always enjoyed my labor what ever I done. When I went to sea, when I cut stone, when I cut ice, or sold maps or cut hay. I was happy and especially was happy when I secured a thousand acres of as fine land nearly as I ever saw and had it paid for.

I regard labor as one of the greatest blessings that nature bestowed on man kind or any other creature. I have done a great deal of work. I have made 13 farms I have raised thousands of tons of feed and food for man and beast, such as grain, hay, beef, pork, fowels, vegetables, fruit, butter, eggs, honey to supply the wants of my fellow man. Labor has been no punishment for me for partaking of the fruit of knowledge work is pleasure, knowledge is power. Labor and knowledge enable us to make an honest living and be at rest when we die. Now in the fall of 1852 after putting up some hay and buildings a little house 14 feet square I went back to Maine and made a short visit. I went there by finishing my maps came back to Henry Co. Iowa bought a little more land and on the 17 day of April I married Mary F. Clough, Daughter of John and Grace Morley. We moved into our house and began to improve our house and began to improve our land as fast as we could, though it was a slow process when timber was scarce and 6 miles away and our principal market town was Burlington near 30 miles away and our team was made up of young wild steers. In 2½ years we got our timber stone and lumber and built a good substantial house 16 by 18 feet. and with a good cellar under it walled with rock and a chamber (small room above). Then we hauled the first house to within 10 ft. of the new one and built a room between them, then we had a house with 3 rooms, a cellar and chamber. Soon after this a portable circular saw mill come into the neighborhood of my 20 acres of timber in Virginia Grove about 6 miles from home and we went to work cutting logs and hauling them to mill and sawed out a frame for a barn 38 by 44 posts 16 ft. high and brought boards from Burlington and built a most substanial barn. I done nearly all the chopping, hauling, quarrying, and digging for those buildings with my own hands, and with steers to haul. I also fenced ground fast as I could but it was 3 or 4 years before I raised much grain. In the mean time I made good use of the prairie grass and hay. We continued to improve our land and farm and sell a piece of land once in a while for over 11 years when in the summer of 1864 I sold the last ½ section (320 a.) and my 20 acres of timber in Virginia Grove for $7500. In the spring of 1863 I began to build a good substanial house 30 by 40 put a good cellar under all with rock wall and was plastering it when I sold so I finished the house and did not move into it. The sales of all the tract of land I had here amounted to $12,000 including my improvements.

In September 1864 I made a sale of personal property and moved to Union County Iowa where I had previously bought of the United States 2 sections and one sixteenth of a section.

We arrived in Union Co. October 1, 1864. We brought 5 children with us to this county and moved into a spare house of Uncle Daniel Clough 5 miles from where we built our home where I now live. The county was very new and scarsely settled. No lumber to be had I went to work dug out rock in the bank of 12 mile creek for a cellar, before the ground froze and hauled them to our place ready to make a cellar in the spring, then to get lumber to build I logged on shares of Uncle John Cloughs land and hauled them to Kentreis and Shepards mill about 1½ miles away and gave ½ the logs at the mill. During the winter and spring of that year I got the logs sawed and lumber hauled to my place and soon as the frost was out the ground, dug a cellar and laid up the wall and put the house during the summer and fall and moved in just a year after we arrived in the county. The house was 18 by 24 but substantially built. Shooted and shingled from the ground up all in one room, but not plastered. I filled the cracks with morter and it was quite comfortable. We lived in it about 6 years, by which time built another house 30 by 40 ft. put a cellar under all with rock wall. It will be noticed it took me a whole year to get our first house up including the breaking of about 30 a. of ground and putting up about 10 tons of hay and tending my family. Everything was wide apart from where I built to the timber, and mill was about 6 miles. From the mill to my farm it was 5 miles from where I lived to the quarry then on to my farm was 4 miles. So to complete the circle was about 18 miles more or less and to this I had to cross 5 streams that was unfortable often and in crossing 12 mile creek at one time I got the best horse I ever owned drowned. I paid 15¢ a lb. for nails to build my first stone house in this county. I paid $8.00 a barrel for salt, $6.00 a 100 for flour and went to Winterset in Madison Co. for it. I paid $1.00 a bu. for corn and 50¢ a dozen for sheaf oats of Levi Right. It may be seen that it took money as well as time to make a home in this new county at that time. But we lived through all and enjoyed ourselves nicely.

In the fall of 1865 October 1 we moved into our house and went on to improve our land as fast as we could by fencing and building I bought timber on Grand River some of it 6 and some 3 miles East of our place to fence and build with. I fenced with nails that I made myself, and hauled them mostly with oxen. I fenced 9 farms with rails and 4 with posts and barb wire.

I improved 13 farms in Iowa the smallest 40 acres 2 of them 160 acres. Three of them were 40 acres each the rest were 80 acres each. I build 10 dwelling houses on our land. Two of them were 30 by 40 ft. each they were built on the 160 acre farms. They had good cellars under all with good rock wall. These houses were most substancially built and finished through out. The farm on which I live in Union Co. Iowa has 3 good substantial barns 2 good wagon houses and corn cribs combined and other buildings to the number of 15 good substantial buildings. As I would get my lands inclosed with rails, I would plant hedge inside until I have made about 7 miles of good Osage hedge fence. Much of the fencing and building material was hauled 10 miles and some of it 13 miles from my timber to the farms. I believe all the hauling of timber, stone and sand to make all of these improvements would average as much as 7 miles. Some sand I hauled 5 miles. Some of the long timbers for barns which were of pine I hauled 30 miles. All the fencing was got out of my native timber which I chopped, split and hauled myself. My boys helped me some I hired very little. I have made 5 cellars all walled with rock. I have made 14 good wells on the land all walled with rock which I quarried and hauled myself. I did all the walling of these walls and cellars and did most of the digging myself. Beside this improving of land we have done a lot of farming. We have raised thousands of tons of good things to feed and eat: wheat, corn, oats, and other grains, beef, pork, mutton, poultry, vegetables, fruits, honey, butter, eggs, etc. Besides this work I have done a considerable business in the way of entering land and selling it, paying taxes and loaning money

sometimes at a profit sometimes a loss. On the whole I have done moderately well. On the whole I have enjoyed my labor and been happy and believe I have done some good in the world. We have had 13 children they are all living this 9th day of March 1900. When I look back over our work that my wife and I have done I wonder how we could have done so much and have done it so well.

Having arrived at the age of 75 years and work becoming so hard and my children having all left us but 2 and they are not likely to stay much longer. I concluded to sell our farm and home and stock and tools and go to some small town where we could live comfortably rest from our labors. So we advertised a two day sale of the 17 and 18 days of October 1899. We sold our personal property on the 18 and the farm the 17. The personal property brought about 3200 dollars. The 160 acre farm was bid off by Ed Sherwood but was not taken and was afterward sold to Lew Taylor for eight thousand dollars and we moved March 5, 1900, and we moved to Arispe Union Co., Iowa where we had previously bought a house and lot for $500 where with some addition and repairs we have a good home and not much work to do. This 28 day of October 1901.

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DOCUMENT #2 *Life in the First Large American Factories*

As noted in the earlier case on Slater and Lowell, the first factories in the United States, as elsewhere, arose in the cotton textile industry. Lowell, Massachusetts, the "City of Spindles," became the first planned industrial city in the United States. It grew from a population of around 200 in 1820 to about 20,000 in 1840 and more than 30,000 by 1845, which made it the seventh largest city in the United States—a phenomenal record of growth.[1]

In the early 1840s, about thirty mills in Lowell each employed 250-300 "operatives" (factory workers) in large red-brick plants five or six stories high. The majority of the operatives were young women who had grown up on New England farms. Most of these "factory girls," as they were called, and as they called themselves in the copious letters, articles, and memoirs they left behind, came to Lowell in their late teens to escape the drudgery of farm work, earn a cash wage, and meet others like themselves. The Lowell labor system had been designed to avoid the conditions associated with England's "dark Satanic mills," as the poet William Blake called them, in which children and adults labored extremely long hours in horrible conditions and lived in squalid slums.

The "factory girls" of Lowell lived in well-constructed company-owned boardinghouses whose "matrons" enforced a 10:00 p.m. curfew. The companies also sponsored churches, lecture series, and other educational opportunities. This early form of welfare capitalism, because it contrasted so clearly with European factory conditions, received an enormous amount of favorable publicity. Yet the reality usually fell short of the idealized vision. Hours were long, and working conditions in the noisy, lint-filled mills were unpleasant and unhealthy. Life in the

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1. This introduction owes much to Philip S. Foner, ed., *The Factory Girls* (Urbana, Ill: University of Illinois Press, 1977); Benita Eisler, ed., *The Lowell Offering: Writings by New England Mill Women (1840-1845)* (Philadelphia Lippincott, 1977); and Thomas Dublin, ed., *Farm to Factory: Women's Letters, 1830-1860* (New York: Columbia University Press, 1981).

boardinghouses was crowded, with six operatives sleeping two to a bed in rooms about 15-feet square. Wages remained low, but were generally higher than those from teaching, sewing, and the few other paid occupations available to women at this time. So a continuous supply of recruits, animated by "Lowell fever," continued to apply for work. Some stayed only a short time, while others remained for decades. The average was between four and five years.

Among the cultural appurtenances to life in Lowell were printed newspapers and magazines to which the operatives contributed articles and poems. The following selection, a vivid description of life in the mills and dormitories written by Josephine L. Baker, appeared in ***The Lowell Offering****, Vol. V (1845), pp. 97-100. It is reprinted in Eisler, ed.,* ***The Lowell Offering****, pp. 77-82.*

A Second Peep at Factory Life

There is the "counting-room," a long, low, brick building, and opposite is the "store-house," built of the same material, after the same model. Between them, swings the ponderous gate that shuts the mills in from the world without. But, stop; we must get "a pass," ere we go through, or "the watchman will be after us." Having obtained this, we will stop on the slight elevation by the gate, and view the mills. The one to the left rears high its huge sides of brick and mortar, and the belfry, towering far above the rest, stands out in bold relief against the rosy sky. The almost innumerable windows glitter, like gems, in the morning sunlight. It is six and a half stories high, and, like the fabled monster of old, who guarded the sacred waters of Mars, it seems to guard its less aspiring sister to the right; that is five and half stories high, and to it is attached the repair-shop. If you please, we will pass to the larger factory,—but be careful, or you will get lost in the mud, for this yard is not laid out in such beautiful order, as some of the factory yards are, nor can it be.

We will just look into the first room. It is used for cleaning cloth. You see the scrubbing and scouring machines are in full operation, and gigging and fulling are going on in full perfection. As it is very damp, and the labor is performed by the other half of creation [i.e., men], we will pass on, for fear of incurring their jealousy. But the very appearance might indicate that there are occasionally, *fogs* and *clouds;* and not only fogs and clouds, but sometimes plentiful showers. In the second room the cloth is *"finished,"*: going through the various operations of burling, shearing, brushing, inking, fine-drawing, pressing, and packing for market. This is the pleasantest room on the corporation, and consequently they are never in want of help. The shearing, brushing, pressing and packing is done by males, while the burling, inking, marking and fine-drawing is performed by females. We will pass to the third room, called the "cassimere weaving-room," where all kinds of cloths are woven, from plain to the most exquisite fancy. There are between eighty and ninety looms, and part of the dressing is also done here. The fourth is the "broad weaving-room," and contains between thirty and forty looms; and broad sure enough they are. Just see how lazily the lathe drags backward and forward, and the shuttle—how spitefully it hops from one end of it to the other. But we must not stop longer, or perchance it will hop at us. You look weary; but, never mind! there was an end to Jacob's ladder, and *so* there is a termination to these stairs. Now if you please we will go up to the next room, where the spinning is done. Here we have spinning jacks or jennies that dance merrily along whizzing and singing, as they spin out their "long yarns," and it seems but pleasure to watch their movements; but it is hard work, and requires good health and much strength. Do not go too near, as we shall find that they do not understand the established rules of *etiquette*, and might unceremoniously knock us over. We must not stop here longer, for it is twelve o'clock, and we have

the "carding-room" to visit before dinner. There are between twenty and thirty set of cards located closely together, and I beg of you to be careful as we go amongst them, or you will get caught in the machinery. You walk as though you were afraid of getting blue. Please excuse me, if I ask you not to be afraid. 'Tis a wholesome color, and soap and water will wash it off. The girls, you see, are partially guarded against it, by over-skirts and sleeves; but as it is not *fashionable* to wear masks, they cannot keep it from their faces. You appear surprised at the hurry and bustle now going on in the room, but your attention has been so engaged that you have forgotten the hour. Just look at the clock, and you will find that it wants but five minutes to "bell time." We will go to the door, and be ready to start when the others do; and now, while we are waiting, just cast your eyes to the stair-way, and you will see another flight of stairs, leading to another spinning-room; a picker is located somewhere in that region, but I cannot give you a description of it, as I have never had the courage to ascend more than five flight of stairs at a time. And—but the bell rings.

Now look out—not for the engine—but for the rush to the stairway. O mercy! what a crowd. I do not wonder you gasp for breath; but, keep up courage; we shall soon be on terra firma again. Now, safely landed, I hope to be excused for taking you into such a crowd. Really, it would not be fair to let you see the factory girls and machinery for nothing. I shall be obliged to hurry you, as it is some way to the boarding-house, and we have but thirty minutes from the time the bell begins to ring till it is done ringing again; and then all are required to be at their work. There is a group of girls yonder, going our way; let us overtake them, and hear what they are talking about. Something unpleasant I dare say, from their earnest gestures and clouded brows.

"Well, I do think it is too bad," exclaims one.

"So do I," says another. "This cutting down wages *is not* what they cry it up to be. I wonder how they'd like to work as hard as we do, digging and drudging day after day, from morning till night, and then, every two or three years, have their wages reduced. I rather guess it wouldn't set very well."

"And besides this, who ever heard, of such a thing as their being raised again," says the first speaker. "I confess that I never did, so long as I've worked in the mill, and that's been these ten years."

"Well, it is real provoking any how," returned the other, "for my part I should think they had made a clean sweep this time. I wonder what they'll do next."

"Listeners never hear any good of themselves" is a trite saying, and, for fear it may prove true in our case, we will leave this busy group, and get some dinner. There is an open door inviting us to enter. We will do so. You can hang your bonnet and shawl on one of those hooks, that extend the length of the entry for that purpose, or you can lay them on the banisters, as some do. Please to walk into the dining-room. Here are two large square tables, covered with checked cloths and loaded down with smoking viands, the odor of which is very inviting. But we will not stop here; there is the long table in the front room, at which ten or fifteen can be comfortably seated. You may place yourself at the head. Now do not be bashful or wait to be helped, but comply with the oft-made request, "help yourself" to whatever you like best; for you have but a few minutes allotted you to spend at the table. The reason why, is because you are a rational, intelligent, thinking being, and ought to know enough to swallow your food whole; whereas a horse or an ox, or any other dumb beast knows no better than to spend an hour in the *useless* process of mastication. The bell rings

again, and the girls are hurrying to the mills; you, I suppose, have seen enough of them for one day, so we will walk up stairs and have a *tete-a-tete*.

You ask, if there are so many things objectionable, why we work in the mill. Well, simply for this reason,—every situation in life, has its trials which must be borne, and factory life has no more than any other. There are many things we do not like; many occurrences that send the warm blood mantling to the cheek when they must be borne in silence, and many harsh words and acts that are not called for. There are objections also to the number of hours we work, to the length of time allotted to our meals, and to the low wages allowed for labor; objections that must and will be answered; for the time has come when something, besides the clothing and feeding of the body is to be thought of; when the mind is to be clothed and fed; and this cannot be as it should be, with the present system of labor. Who, let me ask, can find that pleasure in life which they should, when it is spent in this way. Without time for the laborer's own work, and the improvement of the mind, save the few evening hours; and even then if the mind is enriched and stored with useful knowledge, it must be at the expense of health. And the feeling too, that comes over us (there is no use in denying it) when we hear the bell calling us away from repose that tired nature loudly claims—the feeling, that we are *obliged to go*. And these few hours, of which we have spoken, are far too short, three at the most at the close of day. Surely, methinks, every heart that lays claim to humanity will feel 'tis not enough. But this, we hope will, ere long, be done away with, and labor made what it should be; pleasant and inviting to every son and daughter of the human family.

There is a brighter side to this picture, over which we would not willingly pass without notice, and an answer to the question, why we work here? The time we *do* have is our own. The money we earn comes promptly; more so than in any other situation; and our work, though laborious is the same from day to day; we know what it is, and when finished we feel perfectly free, till it is time to commence it again.

Besides this, there are many pleasant associations connected with factory life, that are not to be found elsewhere.

There are lectures, evening schools and libraries, to which all may have access. The one thing needful here, is the time to improve them as we ought.

There is a class, of whom I would speak, that work in the mills, and will while they continue in operation. Namely, the many who have no home, and who come here to seek, in this busy, bustling "City of Spindles," a competency that shall enable them in after life, to live without being a burden to society,—the many who toil on, without a murmur, for the support of an aged mother or orphaned brother and sister. For the sake of them, we earnestly hope labor may be reformed; that the miserable, selfish spirit of competition, now in our midst, may be thrust from us and consigned to eternal oblivion.

There is one other thing that must be mentioned ere we part, that is the practice of sending agents through the country to decoy girls away from their homes with the promise of high wages, when the market is already stocked to overflowing. This is certainly wrong, for it lessens the value of labor, which should be ever held in high estimation, as the path marked out by the right hand of God, in which man should walk with dignity.

And now, kind friend, we must part. I beg pardon for intruding so long upon your time and patience, and also for not introducing you to Dorcas Hardscrabble. I feared I should weary you, and besides, many hardscrabbling Dorcases may be found among the factory girls.

One word for what has been said. It has been uttered for *truth's* sake, and because called for. If it does not answer your expectations, a companion must be sought, that will please the fancy better.

DOCUMENT #3 *The First Official Investigation of Labor Conditions in Massachusetts: Textile Mills, 1845*

In 1845, operatives in several Massachusetts mill towns petitioned the state legislature to mandate by law a workday no more than ten hours in length. The following document is the legislature's official report in response to the petition. It was written by the chair of the committee, Representative William Schouler, who himself lived in Lowell and edited the local newspaper.

Source: *Massachusetts House Documents*, No. 50, March 1845.

The Special Committee to which was referred sundry petitions relating to the hours of labor, have considered the same and submit the following Report:

The first petition which was referred to your committee, came from the city of Lowell and was signed by Mr. John Quincy Adams Thayer, and eight hundred and fifty others, "peaceable, industrious, hard working men and women of Lowell." The petitioners declare that they are confined "from thirteen to fourteen hours per day in unhealthy apartments," and are thereby "hastening through pain, disease and privation, down to a premature grave." They therefore ask the Legislature "to pass a law providing that ten hours shall constitute a day's work," and that no corporation or private citizen "shall be allowed, except in cases of emergency, to employ one set of hands more than ten hours per day."

The second petition came from the town of Fall River, and is signed by John Gregory and four hundred and eighty-eight others. These petitioners ask for the passage of a law to constitute "ten hours a day's work in all corporations created by the Legislature."

The third petition signed by Samuel W. Clark and five hundred others, citizens of Andover, is in precisely the same words as the one from Fall River.

The fourth petition is from Lowell, and is signed by James Carle and three hundred others. The petitioners ask for the enactment of a law making ten hours a day's work, where no specific agreement is entered into between the parties.

The whole number of names on the several petitions is 2,139, of which 1,151 are from Lowell. A very large proportion of the Lowell petitioners are females. Nearly one half of the Andover petitioners are females. The petition from Fall River is signed exclusively by males.

In view of the number and respectability of the petitioners who had brought their grievances before the Legislature, the Committee asked for and obtained leave of the House to send for "persons

and papers," in order that they might enter into an examination of the matter, and report the result of their examination to the Legislature as a basis for legislative action, should any be deemed necessary.

On the 13th of February, the Committee held a session to hear the petitioners from the city of Lowell. Six of the female and three of the male petitioners were present, and gave in their testimony.

The first petitioner who testified was Eliza R. Hemmingway. She had worked 2 years and 9 months in the Lowell Factories; 2 years in the Middlesex, and 9 months in the Hamilton Corporations. Her employment is weaving,—works by the piece. The Hamilton Mill manufactures cotton fabrics. The Middlesex, woollen fabrics. She is now at work in the Middlesex Mills, and attends one loom. Her wages average from $16 to $23 a month exclusive of board. She complained of the hours for labor being too many, and the time for meals too limited. In the summer season, the work is commenced at 5 o'clock, a.m., and continued till 7 o'clock, p.m., with half an hour for breakfast and three quarters of an hour for dinner. During eight months of the year, but half an hour is allowed for dinner. The air in the room she considered not to be wholesome. There were 293 small lamps and 16 large lamps lighted in the room in which she worked, when evening work is required. These lamps are also lighted sometimes in the morning. About 130 females, 11 men, and 12 children (between ages 11 and 14) work in the room with her. She thought the children enjoyed about as good health as children generally do. The children work but 9 months out of 12. The other 3 months they must attend school. Thinks that there is no day when there are less than six of the females out of the mill from sickness. Has known as many as thirty. She, herself, is out quite often, on account of sickness. There was more sickness in the Summer than in Winter months; though in the Summer, lamps are not lighted. She thought there was a general desire among the females to work but ten hours, regardless of the pay. Most of the girls are from the country, who work in the Lowell Mills. The average time which they remain there is about three years. She knew one girl who had worked there 14 years. Her health was poor when she left. Miss Hemmingway said her health is better where she now worked, than it was when she worked on the Hamilton Corporation.

She knew of one girl who last winter went into the mill at half past 4 o'clock, a.m., and worked till half past 7 o'clock, p.m. She did so to make more money. She earned from $25 to $30 per month. There is always a large number of girls at the gate wishing to get in before the bell rings. On the Middlesex Corporation one fourth part of the females go into the mill before they are obliged to. They do this to make more wages. A large number come to Lowell to make money to aid their parents who are poor. She knew of many cases where married women came to Lowell and worked in the mills to assist their husbands to pay for their farms. The moral character of the operatives is good. There was only one American female in the room with her who could not write her name.

Miss Sarah G. Bagley said she had worked in the Lowell Mills eight years and a half, six years and a half on the Hamilton Corporation, and two years on the Middlesex. She is a weaver, and works by the piece. She worked in the mills three years before her health began to fail. She is a native of New Hampshire, and went home six weeks during the summer. Last year she was out of the mill a third of the time. She thinks the health of the operatives is not so good as the health of females who do house-work or millinery business. The chief evil, so far as health is concerned, is the shortness of time allowed for meals. The next evil is the length of time employed - not giving them time to cultivate their minds. She spoke of the high moral and intellectual character of the girls. That many were engaged as teachers in the Sunday schools. That many attended the lectures of the Lowell Institute; and she thought, if more time was allowed, that more lectures would be given and more girls attend. She thought that the girls generally were favorable to the ten hour system. She had presented

a petition, same as the one before the Committee, to 132 girls, most of whom said they would prefer to work but ten hours. In a pecuniary point of view, it would be better, as their health would be improved. They would have more time for sewing. Their intellectual, moral and religious habits would also be benefited by the change.

Miss Bagley said, in addition to her labor in the mills, she had kept evening school during the winter months, for four years, and thought that this extra labor must have injured her health.

Miss Judith Payne testified that she came to Lowell 16 years ago, and worked a year and a half at the Merrimack Cotton Mills, left there on account of ill health, and remained out over seven years. She was sick most of the time she was out. Seven years ago she went to work in the Boott Mills, and has remained there ever since; works by the piece. She has lost, during the last seven years, about one year from ill health. She is a weaver, and attends three looms. Last pay-day she drew $14.66 for five weeks work; this was exclusive of board. She was absent during the five weeks but half a day. She says there is a very general feeling of favor in the ten hour system among the operatives. She attributes her ill health to the long hours of labor, the shortness of time for meals, and the bad air of the mills. She had never spoken to Mr. French, the agent, or to the overseer of her room, in relation to these matters. She could not say that more operatives died in Lowell than other people.

Miss Olive J. Clark—She is employed on the Lawrence Corporation; has been there five years; makes about $1.62½ per week, exclusive of board. She has been home to New Hampshire to school. Her health never was good. The work is not laborious; can sit down about a quarter of the time. About fifty girls work in the spinning-room with her, three of whom signed the petition. She is in favor of the ten hour system, and thinks that the long hours had an effect upon her health. She is kindly treated by her employers. There is hardly a week in which there is not some one out on account of sickness. Thinks the air is bad, on account of the small particles of cotton which fly about. She has never spoken with the agent or overseer about working only ten hours.

Miss Cecilia Phillips has worked four years in Lowell. Her testimony was similar to that given by Miss Clark.

Miss Elizabeth Rowe has worked in Lowell 16 months, all the time on the Lawrence Corporation, came from Maine, she is a weaver, works by the piece, runs four looms. "My health," she says, "has been very good indeed since I worked there, averaged three dollars a week since I have been there besides my board; have heard very little about the hours of labor being too long." She consented to have her name put on the petition because Miss Phillips asked her to. She would prefer to work only ten hours. Between 50 and 60 work in the room with her. Her room is better ventilated and more healthy than most others. Girls who wish to attend lectures can go out before the bell rings; my overseer lets them go, also Saturdays they go out before the bell rings. It was her wish to attend four looms. She has a sister who has worked in the mill seven years. Her health is very good. Don't know that she has ever been out on account of sickness. The general health of the operatives is good. Have never spoken to my employers about the work being too hard, or the hours too long. Don't know any one who has been hastened to a premature grave by factory labor. I never attended any of the lectures in Lowell on the ten hour system. Nearly all the female operatives in Lowell work by the piece; and of the petitioners who appeared before the Committee, Miss Hemmingway, Miss Bagley, Miss Payne and Miss Rowe work by the piece, and Miss Clark and Miss Phillips by the week.

Mr. Gilman Gale, a member of the city council, and who keeps a provision store, testified that the short time allowed for meals he thought the greatest evil. He spoke highly of the character of the operatives and of the agents; also of the boarding houses and the public schools. He had two children in the mills who enjoyed good health. The mills are kept clean and as well ventilated as it is possible for them to be.

Mr. Herman Abbott has worked in the Lawrence Corporation 13 years. Never heard much complaint among the girls about the long hours, never heard the subject spoken of in the mills. Does not think it would be satisfactory to the girls to work only ten hours, if their wages were to be reduced in proportion. Forty-two girls work in the room with him. The girls often get back to the gate before the bell rings.

Mr. John Quincy Adams Thayer, has lived in Lowell four years, "Works at physical labor in the summer season, and mental labor in the winter." Has worked in the big machine shop 24 months, off and on; never worked in a cotton or woollen mill. Thinks that the mechanics in the machine shop are not so healthy as in other shops; nor so intelligent as the other classes in Lowell. He drafted the petition. Has heard many complain of the long hours.

Mr. S. P. Adams, a member of the House from Lowell, said he worked in the machine shop, and the men were as intelligent as any other class, and enjoyed as good health as any persons who work in-doors. The air in the shop is as good as in any shop. About 350 hands work there, about half a dozen of whom are what is called ten hour men; they all would be ten hour men if they could get as good pay.

The only witnesses whom the Committee examined, whose names were not on the petition, were Mr. Adams and Mr. Isaac Cooper, a member of the House from Lowell, and also has worked as an overseer in the Lawrence cotton mills for nine years. His evidence was very full. He gave it as his opinion that the girls in the mills enjoyed the best health, for the reason that they rise early, go to bed early, and have three meals regular. In his room there are 60 girls, and since 1837, has known of only one girl who went home from Lowell and died. He does not find that those who stay the longest in the mill grow sickly and weak. The rooms are heated by steampipes, and the temperature of the rooms is regulated by a thermometer. It is so he believes in all the mills. The heat of the room varies from 62 to 68 degrees.

The above testimony embraces all the important facts which are elicited from the persons who appeared before the Committee.

On Saturday the 1st of March, a portion of the Committee went to Lowell to examine the mills, and to observe the general appearance of the operatives therein employed. They arrived at Lowell after an hour's ride upon the railroad. They first proceeded to the Merrimack Cotton Mills, in which are employed usually 1,200 females and 300 males. They were permitted to visit every part of the works and to make whatever inquiries they pleased of the persons employed. They found every apartment neat and clean, and the girls, so far as personal appearance went, healthy and robust, as girls are in our country towns.

The Committee also visited the Massachusetts and Boott Mills, both of which manufacture cotton goods. The same spirit of thrift and cleanliness, of personal comfort and contentment, prevailed there. The rooms are large and well lighted, the temperature comfortable, and in most of the window sills were numerous shrubs and plants, such as geraniums, roses, and numerous varieties of cactus.

These were the pets of the factory girls, and they were to the Committee convincing evidence of the elevated moral tone and refined taste of the operatives.

The Committee also visited the Lowell and the Middlesex mills; in the first of which carpets are manufactured, and in the second, broadcloths, cassimeres, etc. These being woolen mills, the Committee did not expect to find that perfect cleanliness which can be and has been attained in cotton mills. It would, however, be difficult to institute a comparison between the mills on this point, or to suggest an improvement. Not only is the interior of the mills kept in the best order, but great regard has been paid by many of the agents to the arrangement of the enclosed grounds. Grass plats have been laid out, trees have been planted, and fine varieties of flowers in their season, are cultivated within the factory grounds. In short, everything in and about the mills, and the boarding houses appeared, to have for its end, health and comfort. The same remark would apply to the city generally. Your committee returned fully satisfied, that the order, decorum, and general appearance of things in and about the mills, could not be improved by any suggestion of theirs, or by any act of the Legislature.

During our short stay in Lowell, we gathered many facts, which we deem of sufficient importance to state in this report, and first, in relation to the Hours of Labor.

From Mr. Clark, the agent of the Merrimack Corporation, we obtained the following table of the time which the mills run during the year.

Begin work. From 1st May to 31st August, at 5 o'clock. From 1st September to 30th April, as soon as they can see.

Breakfast. From 1st November to 28th February, before going to work. From 1st March to 31st of March, at 7½ o'clock. From 1st April to 19th September, at seven o'clock. From 20th September to 31st October, at 7½ o'clock. Return in half an hour.

Dinner. Throughout the year at 12½ o'clock. From 1st May to 31st August, return in 45 minutes. From 1st September to 30th April, return in 30 minutes.

Quit work. From 1st May to 31st August, at 7 o'clock. From 1st September to 19th September, at dark. From 20th September to 19th March, at 7½ o'clock. From 20th March to 30th April, at dark.

Lamps are never lighted on Saturday evenings. The above is the time which is kept in all the mills in Lowell, with a slight difference in the machine shop; and it makes the average daily time throughout the year, of running the mills, to be twelve hours and ten minutes.

There are four days in the year which are observed as holidays, and on which the mills are never put in motion. These are Fast Day, Fourth of July, Thanksgiving Day, and Christmas Day. These make one day more than is usually devoted to pastime in any other place in New England. The following table shows the average hours of work per day throughout the year in the Lowell Mills:

	Hours	Minutes		Hour	Minutes
January	11	24	July	12	45
February	12		August	12	45
March[a]	11	52	September	12	23
April	13	31	October	12	10
May	12	45	November	11	56
June	12	45	December	11	24

[a]The hours of labor on the 1st of March are less than in February, even though the days are a little longer, because 30 minutes are allowed for breakfast from the 1st of March to the 1st of September.

Your Committee have not been able to give the petitions from the other towns in this State a hearing. We believed that the whole case was covered by the petition from Lowell, and to the consideration of that petition we have given our undivided attention, and we have come to the conclusion *unanimously,* that legislation is not necessary at the present time, and for the following reasons:

1st. That a law limiting the hours of labor, if enacted at all, should be of a general nature. That it should apply to individuals or copartnerships as well as to corporations. Because, if it is wrong to labor more than ten hours in a corporation, it is also wrong when applied to individual employers, and your Committee are not aware that more complaint can justly be made against incorporated companies in regard to the hours of labor, than can be against individuals or copartnerships.

2d. Your Committee believe that the factory system, as it is called, is not more injurious to health than other kinds of indoor labor. That a law which would compel all of the factories in Massachusetts to run their machinery but ten hours out of the 24, while those in Maine, New Hampshire, Rhode Island and other States in the Union, were not restricted at all, the effect would be to close the gate of every mill in the State. . . .

3d. It would be impossible to legislate to restrict the hours of labor, without affecting very materially the question of wages; and that is a matter which experience has taught us can be much better regulated by the parties themselves than by the Legislature. Labor in Massachusetts is a very different commodity from what it is in foreign countries. Here labor is on an equality with capital, and indeed controls it, and so it ever will be while free education and free constitutions exist. And although we may find fault, and say, that labor works too many hours, and labor is too severely tasked, yet if we attempt by legislation to enter within its orbit and interfere with its plans, we will be told to keep clear and to mind our own business. Labor is intelligent enough to make its own bargains, and look out for its own interests without any interference from us; and your Committee want no better proof to convince them that Massachusetts men and Massachusetts women, are equal to this, and will take care of themselves better than we can take care of them, than we had from the intelligent and virtuous men and women who appeared in support of this petition, before the Committee.

4th. The Committee do not wish to be understood as conveying the impression, that there are not abuses; we think that many improvements may be made, and we believe will be made, by which labor will not be so severely tasked as it now is. We think that it would be better if the hours for labor were less,—if more time was allowed for meals, if more attention was paid to ventilation and pure air in our manufactories, and work shops, and many other matters. We acknowledge all this, but we say, the remedy is not with us. We look for it in the progressive improvement in art and science,

in a higher appreciation of man's destiny, in a less love for money, and a more ardent love for social happiness and intellectual superiority. . . .

For the Committee,
Wm. Schouler, Chairman

DOCUMENT #4 *Response to the Legislature's Report*

Source: *Voice of Industry,* November 28, 1845. Reprinted in Foner, *The Factory Girls*, p. 246.

On the Defeat of William Schouler

We are requested to publish the following Resolution, unanimously adopted by the "Female Labor Reform Association," at their last meeting, as a token of respect and esteem, for the services of Mr. Schouler, in behalf of the operatives of this city.

Resolved, That the members of this Association, tender their grateful acknowledgements to the voters of Lowell, for consigning Wm. Schouler, to the obscurity he so justly deserves, for treating so unjustly and ungentlemanly, the defence made by the delegates of this Association; before the special committee of the Legislature, to whom was referred petitions for the reduction of the hours of labor, of which he was Chairman.

DOCUMENT #5 *From "Factory Tracts" (1845), A Female Operative's View.*

Source: Reprinted in Foner, *The Factory Girls*, pp. 132-134.

The Evils of Factory Life

Among the first which we shall notice, is the tendency it has, at the present time, to destroy all love of order and practice in domestic affairs. It is a common remark, that by the time a young lady has worked in a factory one year, she will lose all relish for the quiet, fireside comforts of life, and the neatness attendant upon order and precision. The truth is, time is wanting, and opportunity, in order to cultivate the mind and form good habits. All is hurry, bustle and confusion in the street, in the mill, and in the overflowing boarding house. If there chance to be an intelligent mind in the crowd which is striving to lay up treasures of knowledge, how unfavorably it is situated. Crowded into a small room which contains three beds and six females, all possessing the "without end" tongue of woman, what chance is there for *studying?* and much less for sober thinking and reflecting? Some lofty, original minds, we will allow, have surmounted all the obstacles of a factory life and come out, like gold, refined from all the dross of baneful society and pernicious examples, but they are cases of rare occurrence. But few have the moral courage and perseverance to travel on in the rugged paths of science and improvement amid all these and many other discouragements. After thirteen hours unremitting toil, day after day and week after week, how much energy and life would remain to nerve on the once vigorous mind in the path of wisdom? What ambition or pride would such females possess, to enable them to practice good order and neatness! They are confined so long in close,

unhealthy rooms that it is a greater wonder that they possess any life or animation, more than the machines which they have watched so unceasingly!

Let us look forward into the future, and what does the picture present to our imagination! Methinks I behold the self same females occupying new and responsible stations in society. They are now wives and mothers! But oh! how deficient in everything pertaining to those holy, *sacred* names! Behold what disorder, confusion and disquietude reigns, where quiet, neatness and calm serenity should sanctify and render almost like heaven the home of domestic union and love! Instead of being qualified to rear a family—to instruct them in the great duties of life—to cultivate and unfold the intellect—to imbue the soul in the true and living principles of right and justice—to teach them the most important of all lessons, the art of being *useful* members in the world, ornaments in society and blessings to all around them,—*they*, themselves, have need to be instructed in the *very first principles* of living well and thinking right. Incarcerated within the walls of a factory, while as yet mere children—drilled there from five till seven o'clock, year after year—thrown into company with all sorts and descriptions of mind, dispositions and intellects, without counsellor or friend to advise—far away from a watchful mother's tender care, or father's kind instruction—surrounded on all sides with the vain ostentation of fashion, vanity and light frivolity—beset with temptations without, and the carnal propensities of nature within, what *must*, what *will* be the natural, rational result? What but ignorance, misery, and *premature decay* of both *body and intellect*? Our country will be but one great hospital, filled with worn out operatives and colored slaves! Those who marry even, become a curse instead of a help-meet to their husbands, because of having broken the laws of God and their own physical natures, in these modern prisons (alias palaces), in the gardens of Eden! It has been remarked by some writer that the mother educates the man. Now if this be a truth, as we believe it is, to a very great extent, what, we would ask, are we to expect, the same system of labor prevailing, will be the mental and intellectual character of the future generations of New England? What but a race weak, sickly, imbecile, both mental and physical? A race fit only for corporation tools and timeserving slaves? Nobility of America!—producers of all the luxuries and comforts of life! will you not *wake up* on this subject? will you sit supinely down and let the drones in society fasten the yoke of tyranny, which is already fitted to your necks so cunningly that you do not feel it but slightly,—will you, I say suffer them to rivet that yoke upon you, which has crushed and is crushing its millions in the old world to earth; yea, to starvation and death? Now is the time to answer this all-important question. Shall we not hear the response from every hill and vale, "EQUAL RIGHTS, or death to the corporations?" God grant it, is the fervent prayer of

Juliana

Lowell, October, 1845

DOCUMENT #6 *A Female Operative Looks Back.*

Source: "My Experience as a Factory Operative," in *Boston Daily Evening Voice* [a labor daily], Feb. 23, 1867. Reprinted in Foner, *The Factory Girls*, pp. 341-343.

To the Editor of the Daily Evening Voice:

Thirty years ago I was a factory girl in the city of Lowell. I was ambitious to do something for myself in the way of earning money to pay my expenses at an Academy; and being too young to teach school in the country, not strong enough to do housework or learn a trade, went into the card-room on the Fremont Corporation. My work was easy; I could sit down part of the time, and received

($1.75) one dollar and seventy-five cents per week beside my board. Being fond of reverie, and in the habit of constructing scenes and building castles in the air, I enjoyed factory life very well.

After a few months my parents removed from a country town to Lowell, and I went to board with them on the street, and then I began seriously to reflect on the realities of life.

For a delicate girl of fourteen years of age to be called out of bed and be obliged to eat her breakfast without any light, and then frequently wallow through the snow to the factory, stay there until half-past twelve, then run home and swallow her dinner without mastication, run back and stay there until half-past seven, is, to say the least, very unpleasant and unnatural, and exceedingly hurtful to the constitution.

I attended school three months during the following summer; then worked about eighteen months longer in the factory; afterwards worked in the weave-room, in all three years, but only about six months at a time, as my health would not allow me to work longer. The labor of attending three or four looms thirteen hours per day, with no time for recreation or mental improvement is very severe.

The habit of standing on the feet frequently produces varicose veins; and though the girls seldom complain, for they know it is useless, yet it is a fact that factory girls are great sufferers in this respect.

In those days the morals of the girls were well guarded, and they were generally treated respectfully by the overseers, and I think lived well on the corporations.

They were generally daughters of our New England farmers and mechanics, some of them were well educated. Many of them had learned trades. Some of them were of a literary turn and get up improvement circles. And I will say in truth that if the hours of labor had been only eight instead of thirteen, I should prefer working in the mill to house work, enjoyed the society of the girls, and the noise of the machinery was not displeasing to me; but after one has worked from daylight until dark, the prospect of working two or three hours more by lamp light is very discouraging.

In 1849 I was thrown into the society of several young women who were daughters of mill owners; and the contrast between their condition and that of the operatives was so great that it led me to serious reflection on the injustice of society. These girls had an abundance of leisure, could attend school when and where they pleased, were fashionably dressed, were not obliged to work any except when they pleased; indeed, they suffered for want of exercise; and while they were so tenderly cared for, lest the "winds of heaven should visit their faces too roughly," the operatives toiled on through summer's heat and winter's cold; many passing into an early grave in consequence of protracted labor, and many others making themselves invalids for life.

For one, I could never see the justice of one set of girls working all the time in order that another set should live in ease and idleless. [The English poet] Cowper says, "I would not have a slave to till my ground, to fan me while I sleep, and tremble when I wake, for all the wealth that sinews bought and sold have ever earned." But many of our people in Massachusetts are quite willing to make fat dividends on the labor of anybody they can hire, widows and orphans, boys and girls of tender age; and when they cannot obtain American girls, they send across the ocean for operatives, and then allow them just enough to keep them from starvation.

I am satisfied from my own experience, as well as from observation of the working classes for many years, that nothing can be done for their education or elevation, until the hours of labor are reduced. After one has worked from ten to fourteen hours at manual labor, it is impossible to study History, Philosophy, or Science.

I well remember the chagrin I often felt when attending lectures, to find myself unable to keep awake; or perhaps so far from the speaker on account of being late, that the ringing in my ears caused by the noise of the looms during the day, prevented my hearing scarcely a sentence he uttered. I am sure few possessed a more ardent desire for knowledge than I did, but such was the effect of the long hour system, that my chief delight was, after the evening meal, to place my aching feet in any easy position, and read a novel.

A Working Woman

DOCUMENT #7 *An Afterword.*

Source: *The Lowell Offering* (1977), p. 29, Benita Eisler, ed.

"Whether they left the mills for health or husbands, in protest, or with the certainty of better jobs elsewhere, by the beginning of the Civil War the presence of the Yankee farm girls was mere memory. Of 7,000 women operatives in 1836, less than 4 percent had been foreign-born. By 1860, 61.8 percent of Lowell's work force were immigrants, almost half of whom were Irish."

Exhibit 1 Pay Scales in Nineteenth-Century America

Cotton Manufacturing, Average Annual Earnings, Full-Time Equivalent, 1832-1899

1832	1849	1859	1869	1879	1889	1899
$163	$176	$201	$298	$244	$302	$286

Woolen Manufacturing, Average Annual Earnings, Full-Time Equivalent, 1832-1899

1832	1849	1859	1869	1879	1889	1899
$183	$214	$232	$335	$306	$372	$301

Iron and Steel Manufacturing, Average Annual Earnings, Full-Time Equivalent, 1832-1899

Full Time		Full-Time Equivalent				
1832	1849	1859	1869	1879	1889	1899
$313	$292	$346	$524	$394	$522	$543

Farm Laborers, Average Monthly Earnings with Board, 1830-1899

1830	1850	1860	1870	1880	1890	1899
$8.85	$10.85	$13.66	$16.57	$11.70	$13.93	$14.56

Common Laborers, Average Daily Earnings, 1832-1890

1832 (with board)	1850 (with board)	1850	1860	1869	1880	1890
$0.52	$0.61	$0.87	$1.06	$1.55	$1.23	$1.46

Domestics [Servants], Average Weekly Wage, 1850-1900

1850	1860	1870	1900
$1.08	$1.34	$2.00	$3.14

Source: Stanley Lebergott, *Manpower in Economic Growth* (New York: McGraw-Hill, 1964), pp. 539, 542-545.

WHARTON REPROGRAPHICS 4

Harvard Business School

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The Coming of the Railroads (Abridged)

I. Introduction

The building of the railroad network ranks as one of the most important developments in American history. By the last quarter of the nineteenth century, the railroad had penetrated every cranny of the economy and affected every person's interest as did no other institution. As the United States experienced rapid growth and regional shifts of its population, the railroad served as the major means of transforming rural and agrarian America into an urban and industrial nation (see **Exhibits 9**, **10**, and **11**).

In 1890, American railroads carried 79.2 billion ton-miles of freight over 163,596 miles of track operated by about 750,000 employees. Passenger mileage amounted to 12.5 billion. Total investment in property, plant and equipment came to over $10 billion. In 1891, the Pennsylvania Railroad alone employed over 110,000, while the total of the nation's armed services was 34,942. At their peak in 1916, mileage reached 254,037, employment 1,701,000, and total capitalization $21 billion.

The chief concern of the business historian in studying the railroads is to determine: 1) their legacy to business management; and 2) their impact on other businesses and industries and on the relationship between government and business enterprise as a whole. These concerns will be explored in depth in succeeding cases. The purpose of this case is: 1) to discuss methods of transportation preceding the railroads; 2) to outline briefly the early growth of the railroads themselves; and 3) to provide data concerning the growth of the United States as a whole.

II. Roads

"The twentieth century observer," an historian has rightly commented, "is sure to have difficulty grasping the realities of the overland transportation in the age of Jefferson. . . ."[1] Many of the roads, especially in rural areas,

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Professor Richard S. Tedlow prepared this case as the basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation. It is partly based on an earlier case entitled "Unifying the National Economy: The Railroads," by Lecturer Albro Martin. Professor Thomas K. McCraw revised and abridged the case.

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1. Peter D. McClelland, "Transportation," in Glenn Porter, ed., *Encyclopedia of American Economic History*, Vol. I (New York: Scribner's, 1980), pp. 309-310.

> . . . were hardly more than broad paths through the forests. In wet places, they presented a line of ruts with frequent mud holes, and, where dry, a powdered surface of deep dust. The largest stones and stumps were removed only so far as was absolutely necessary to permit passage. An early act of the Ohio legislature provided that stumps left in the road should not be more than a foot high. In the most swampy places where mud rendered passage impossible, logs were laid side by side . . . to form what were known as corduroy roads. Across the rivers, a few wooden bridges had been built, but for the most part, fords or ferries were the only recourse.[2]

The roads were maintained as community projects. In slack seasons, farmers would gather to clear roads as best they could, given limited resources.

A wide variety of public figures urged that roads be improved. In a famous report in 1808, Albert Gallatin, President Thomas Jefferson's brilliant Secretary of the Treasury, urged federal funding for a complex of "artificial roads," by which he meant roads that were surveyed to have no more than a 5% grade (a rise of about 250 feet in a distance of one mile), that were ditched on the sides and crowned in the center for drainage purposes, and that were finished with crushed rock or gravel. Indeed, during this period, there was a veritable "rage" for turnpike building.

This enthusiasm had been spurred by the Lancaster Turnpike. Completed in 1794, this thoroughfare connected the rich farmland around Lancaster to Philadelphia. Well maintained and well travelled, the road invited imitators.

In New England and the Middle Atlantic states, turnpikes tended to be privately financed. In New England alone, about $6.5 million had been invested in the roads by 1840. Most roads were capitalized at under $100,000. In Pennsylvania, the state contributed about $2 million of the $6 million invested in turnpikes by 1822. In certain other cases, the state and even federal government were given a special role to play in road construction. Thus, when Ohio became a state in 1803, Congress provided that 5% of the proceeds from public land sales should be devoted to road construction. Of this amount, Congress was to spend 40% and the state itself 60%.

The most important road built with federal funds during this period was the National (or Cumberland) Road. Authorized by Congress in 1806, construction on this road began from Cumberland, Maryland (which was connected by the Frederick Turnpike to Baltimore) in 1811. Wheeling, Virginia (now West Virginia) was reached in 1818 and Columbus, Ohio in 1833. The road's terminus in Vandalia, Illinois was reached around mid-century.

From the financial point of view, the turnpikes were, with some notable exceptions, less than successful. By 1851, the $2.5 million invested in such roads by Kentucky was worth only between $.25 and $.30 on the dollar. Performance was not much better in other states west of the mountains.

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2. George Rogers Taylor, *The Transportation Revolution* (New York: Harper & Row, 1951) p. 15.

In New York, more than half the 4,000 miles of turnpikes in operation in 1822 had been abandoned by 1836. In Pennsylvania, the famous Lancaster Turnpike itself never earned more than 2% on its stock, for all its traffic. Even in New England, where population density was high and distances were short, performance was disappointing. Turnpikes were being abandoned as early as 1818, and by 1835, more than half the roads in Massachusetts were partially or completely abandoned. No more than five or six of the region's 230 ventures paid satisfactory dividends.

The federal road was not much more successful than those of the states. The National Road did carry its share of immigrants to the West, but its contribution to moving their produce in the opposite direction was limited. The road has probably made a greater contribution to interregional trade as Interstate 40 (its modern incarnation) in the age of the internal combustion engine than it did in the antebellum years. Other federal internal improvements were hampered by sectional political problems and perceived constitutional limitations.

Reasons for the disappointing performance of the turnpikes are numerous:

1. They were expensive to build. The best stone turnpikes cost between $5,000 and $10,000 per mile, huge sums for that time.

2. They were expensive to maintain. Weather and heavy use were very hard on the roads, especially those on which the builders had economized.

3. The tolls on the turnpikes were easy to evade. Often, toll takers were not on duty after sundown, so teamsters could wait until dark to move past toll stations. Paths around the toll booth, or "shun pikes" in the jargon of the day, were not uncommon.

4. Even without tolls, the movement of freight by wagon was exceedingly--for some commodities, excessively--expensive. Western produce had an unfavorable ratio of weight and bulk to value. In March of 1817, a New York State legislative committee found that the cost of transportation from Buffalo to New York City was three times the market value of wheat in the latter, six times that of corn, and twelve times that of oats. Transportation costs for wagons are presented along with those for other modes of transportation in **Exhibit 1.**

5. Road travel was also slow. The fastest stage coaches on good roads might average six to eight miles an hour. Heavy freight on poor roads moved at a snail's pace.

III. Canals

As was illustrated in the case on "The Rise of New York Port," canal building was an important weapon in urban competition for western trade. The first canal of great length in the United States was the Erie, which proved to be a phenomenally successful example of public entrepreneurship and daring. (When the idea was proposed to Jefferson shortly before his leaving the presidency in 1809, he is said to have observed, "It is a splendid project and may be erected a century hence." In fact, he lived to see it completed.)

The obvious success of the Erie spawned numerous imitators. By 1860, over 4,300 miles of canals had been built at an estimated cost of almost $200 million. Most of the principal canals were constructed in the Northeast and Midwest. **Exhibit 1** provides data on shipping costs via canal. **Exhibit 2** shows mileage constructed by decade. **Exhibit 3** shows expenditures on canals from 1815 through 1860 broken down by public and private sources. **Exhibit 4** supplies a map of the principal canal routes.

Far more than roads, canals played a vital role in the development of the Midwest. Their reduction of freight rates made commercially feasible the cultivation of a large volume of agricultural produce in the hinterland. The lure of profit which the Erie always held out spurred the nation to greater entrepreneurial effort. Where distances were short and traffic heavy, as was the case with anthracite-carrying canals in eastern Pennsylvania, and those canals that linked one Great Lake to another, financial success was possible.

The problems canals posed were serious, however. Though many of these may be obvious, it is worthwhile to review them:

1. Canals were expensive to build. Most required an outlay of between $20,000 and $30,000 per mile. The upper bound was $80,000.

2. Possible routes for canals were sharply restricted.

3. Canals depended on water. Sometimes, there was too much. "Freshets," sudden rushes of water down a stream caused by heavy rains or melting snow, were a constant problem for some canals, and the result could be very serious financially. A single freshet in 1852 cost the Chesapeake and Ohio Canal Company $100,000 in repairs. Sometimes there was too little water, especially in late summer. And sometimes, unfortunately, water froze, making canals quite useless in the winter.

4. Upkeep was a difficult problem, even without freshets. Banks had to be protected. The channel had to be kept at the proper depth.

5. Canal travel, though faster than that by roads, was very slow relative to railroad travel. If locks were frequent, it would be slowed still further.

Canal promoters had hailed their enterprises as boons which would free the state that built them from the necessity of taxation because of the revenue they generated. Unfortunately, these promises turned out to be inflated, and a number of states wound up fiscally embarrassed as a result of overextending themselves for internal improvements.

IV. Steamboats

The United States is blessed with a complex network of navigable inland waterways. The harnessing of steam for purposes of water travel was of enormous assistance in the exploitation of these natural highways.

Robert Fulton dramatically demonstrated the utility of steamboats by sailing what was supposedly his "folly," the *Clermont*, one hundred fifty miles up the Hudson from New York City

to Albany in 1807. The superiority of steamboats quickly became obvious to everyone, including the captains of competing sailing vessels, which occasionally tried to ram them. As important as steamboats had the potential of being in the East, Fulton understood that the greatest opportunities lay on western lakes and rivers. Four years after the *Clermont's* success, he dispatched Nicholas J. Roosevelt to Pittsburgh to supervise the building and launching of the *New Orleans*. This boat's voyage to its namesake city helped establish the feasibility of steam transport in the West. Steamboats sharply reduced travel time for downstream trips and reduced it by orders of magnitude upstream. By 1850 the journey from New Orleans to Louisville could be accomplished by a fast steamboat in five days. By keelboat, the same trip took three to four months.

A steamboat was, obviously, a type of vehicle rather than a right of way. Its advent, rather than displacing canals or roads, actually increased their use. Indeed, steam travel on the Hudson River and the Great Lakes was a major stimulus to the building of the Erie Canal. The steamboat business could be entered with about $20,000 in capital for a medium-sized boat.

Their numerous advantages made steamboats a major contributor to transportation and, thus, to trade. They, too, however, had their problems:

1. They depended on water. In the North, water froze in the winter. In the West, water levels fluctuated dramatically. At Cincinnati, for example, the spread between high and low water could be as much as forty feet in a few weeks. In the summer, water levels tended to drop. As a result, American engineers built boats that could haul as much as 100 tons while displacing only two feet of water. Westerners joked that boatmen had to have the ability "to navigate in a heavy dew." In the fall and the spring, torrential floods were the problem.

2. In the West, especially, service tended to be irregular because of these unpredictable conditions. "Tramp" steamboats free to seek out available water and traffic were the predominant mode.

3. Steamboating was dangerous. Snags and similar obstructions exacted their toll. Boilers often blew up as captains raced one another like hot rodders. Of western steamboats built before 1849, nearly 30% were lost in accidents. The result was the loss of life and property as well as increased insurance rates.

4. Steamboats could only go where the navigable lakes and rivers were. As a result, trips were needlessly lengthy. By river, the distance from Pittsburgh to Cincinnati is 470 miles, from Pittsburgh to St. Louis 1,164 miles, and from Cincinnati to Nashville 644 miles. These same distances by rail are 316, 612, and 301 miles, respectively.

V. Railroads

For all the problems which they, too, brought with them—speculation, fraud, inflated promises, bankruptcies, accidents, general aggravation—railroads provided a number of benefits that their predecessors did not. Railroads could be built to where the business was. They could keep to a schedule. They could operate in all seasons and in all but the very worst weather.

Above all, they were fast. (**Exhibit 5** provides a graphic illustration of changing rates of travel during the first decades of the nineteenth century.) Railroads made the world of the business-person, as well as that of the private traveler, predictable as had no other innovation. They carried the majority of freight shipped until the second half of the twentieth century and accounted for the majority of passenger miles until just after World War II.

The remainder of this case will provide a narrative of railroad development through the Civil War decade. Succeeding cases will explore key changes in the industry through the remainder of the century and their implications.

* * * * *

As early as the sixteenth century in primitive Alsatian coal mines and somewhat later on a larger scale in England, the heavy products of mines had been trundled short distances in wagons running on some kind of rails and guided along by flanges (protecting rims designed to hold a wheel in place, give it strength, and guide it) on the wheels. Early in the nineteenth century, the granite for the Bunker Hill Monument was carted from the quarry in Quincy, Massachusetts to boats for the trip across the bay by such a "railway."

As for steam power, efforts had been made to harness it to a wheeled vehicle since the latter part of the eighteenth century. But the only type of land vehicle people had ever known had run on conventional roads, which could not support a heavy steam car. What was needed was a practical way of using a steam-driven vehicle to provide the motive power for travel on a road of rails.

The combination of rail and steam was first proved feasible in England, where need and know-how were greatest. The nub of the problem was to make the steam engine more compact, lighter, and more efficient than the clumsy stationary engines of previous years. George Stephenson solved this problem by using a tubular boiler. In October of 1829, Stephenson entered his "Rocket" in the famed Rainhill trials sponsored by the embryonic Liverpool and Manchester Railway to test the performance of locomotives versus stationary steam engines using rope-hauling. Between ten and fifteen thousand spectators turned out to see the Rocket prove its superiority. The Rocket was awarded £500 for pulling a 40-ton payload 12 miles in 53 minutes. The Liverpool and Manchester immediately placed an order for seven units. (Lore has it that, in trying to decide how far apart to space the Rocket's wheels, Stephenson settled on the distance between the wheels of a manure cart and thus fastened on the world the too-narrow gauge of 4 feet 8½ inches.)

The solution of the motive power conundrum made possible the exploitation of a basic virtue of rail transportation—the fact that the flanged wheel running on a flat-laid rail encountered less friction than other wheeled conveyances. This is, of course, as true today as it was in 1829. A 40-ton boxcar of freight set in motion at 60 miles an hour on level track will coast for over five miles. A 5,000-horsepower locomotive can haul 5,000 tons. A modern semi-trailer truck rig requires ten times as much power per ton.

There was great interest in the railroad idea in America from the beginning. The citizens of Baltimore decided in 1828 that a railroad was their only hope to stay in the game of trading with the rapidly expanding interior now that both New York and Philadelphia had, or would soon have, western canals. The first stone of the Baltimore and Ohio was laid in place by the

venerable Charles Carroll, who described the act as "among the most important in my life, second only to my signing the Declaration of Independence, if second even to that." Baltimoreans had no sure idea of what kind of motive power they would use—they experimented with sails, and settled for a short time for real horsepower--but their faith in the new system was reaffirmed when news came that Stephenson had removed at Rainhill all doubt that steam could do the job. The B&O became the first American railroad to haul both freight and passengers by steam on a regular schedule.

But the B&O was not quite the first to haul passengers by steam on a regular schedule. That distinction belongs to the aptly named engine, "Best Friend of Charleston," operated by the Charleston & Hamburg Railroad. This railroad may serve as a symbol of the South's shortcomings in the industrial revolution and a monument to an unfortunate figure in the history of its economic development, Robert Y. Hayne. Hayne began early his effort to propel the South into the industrial age. He envisioned a railroad that would run all the way from Charleston, the best port in the Southeast, to Memphis; and, for a few years, the Charleston & Hamburg, though it reached only a fraction of the distance to Memphis, was the longest railroad in the country. But nothing could make up for the inferiority of the South's ports, the lack of adequate markets for imports and diversity of exports, and an inhumane slave labor system that immobilized capital resources. With the sudden early death of Hayne, what entrepreneurial spirit there was in the southern railroad-building program declined, and on the eve of the Civil War, it had barely begun to evolve a true system.

The 1830s were the "demonstration decade" in the railroad age, as those who had turned to railroad building in desperation discovered that they had made the best of all possible choices. Bostonians, like the entrepreneurs of Baltimore, observed developments in England and decided that only a railroad could carry the city's commerce across the Berkshires to Albany and a connection with the Erie Canal and the railroads that quickly paralleled it. Efforts to make Massachusetts railroads a public works project failed, but private capital, in part with state-guaranteed bonds, got behind three of the most important early railroads in America: the Boston & Worcester, which soon joined the Western Railroad of Massachusetts and enabled New England to divert some of New York's rich western trade; the Boston & Lowell, running northward to serve the booming textile industry and thereby putting the Middlesex Canal out of business; and the Boston & Providence, traversing a route that for years had carried a heavy road traffic.

To the south, it was in Pennsylvania that railroads had their most significant beginnings, but not along the "mainline" between Philadelphia and Pittsburgh, where a great false start was underway in the form of an ill-advised rail/canal/inclined-plane system. It was the anthracite coal producers of eastern Pennsylvania, anxious to ship their coveted fuel to domestic and commercial users in New York and New England, who undertook some of the most successful canals and, then, railroads in American history: The Philadelphia & Reading, the Delaware & Hudson, the Delaware & Lackawanna, and the Lehigh Valley. Meanwhile, the railroad solved the ancient problem of how to haul the great number of travelers between New York and Philadelphia in speed and comfort. A venerable stagecoach line was quickly replaced by the Camden & Amboy Railroad, operating between the New Jersey steamboat pier on Lower New York Bay and the thriving town just across the Delaware River from Philadelphia. Its earliest cars, quaint copies of stagecoaches, provided a grueling ride. In addition, the monopolistic grasp that the railroad had on business irked most travelers. Even so, it was a vast improvement over what had been available. Shortly thereafter (1838), the railroad was, in effect, extended to the nation's capital

via the Philadelphia, Wilmington & Baltimore Railroad, a ferry across the Susquehanna, and the Baltimore & Ohio's branch from Baltimore to Washington.

Railroad building in New York, meanwhile, was slow to begin. The success of the Erie Canal and repressive limitations on railroads adopted by canal-biased state legislators discouraged adoption of the new mode. But in the valley of the Mohawk River between Albany and Buffalo, a group of short railroads was built by such intensely competitive towns as Troy, Schenectady, Rome, Rochester, and Syracuse to haul passenger traffic that the canal had engendered but for which the canal was too slow. Soon, travelers arriving by steamboat at Albany were able to transfer to the first of seven railroads that would carry them with comparative speed to Buffalo. Also, shippers were beginning to discover that even at the high rates the railroads charged, it was advantageous to dispatch their most valuable freight that way, too. By 1840, there were as many miles of railroads in the United States as there were miles of canals.

Then, in the late 1840s, as the nation emerged from a depression, the shift to railroads greatly intensified. In New York State, the residents of the "southern tier" of counties, disgruntled at the advantage the Erie Canal gave their upstate neighbors, clamored for and got a railroad through their region between the Hudson River and Lake Erie. The Erie Railroad was the most poorly planned of the major antebellum lines. It began in the wrong place (Piedmont, New York, on the west bank of the Hudson opposite Tarrytown, instead of across the river from Manhattan) and ended up in an even more wrong place (the Lake Erie village of Dunkirk, instead of Buffalo). As if to top those mistakes, it selected a broad gauge in the mistaken notion that other railroads would not be able to take its traffic away from it. Even so, by 1851, when it reached Lake Erie, it was the longest railroad in the country under one management and an important East-West through route.

As **Exhibit 7** shows, railroad building increased substantially in the Atlantic Seaboard states during the 1840s. But during the 1850s, with the opening of the trans-Appalachian region to railroad building, the boom grew beyond imagining (see **Exhibits 7** and **8**). Track in operation increased approximately fourfold. Lines that eventually became some of the most important in the nation suddenly burst westward from Buffalo toward the raw new cities of Cleveland and Toledo, while west of Detroit, the state of Michigan began a blundering effort to build the Michigan Central towards infant Chicago. The merchants of New York City, alarmed by the ease with which Boston was exchanging East-West trade at Albany via its new railroad, overcame their smugness at the success of their wonderful canal. They privately financed a railroad up the east bank of the Hudson to Albany, where passengers (and more and more freight) could be transferred to the lines that continued west. It remained for Commodore Cornelius Vanderbilt to recognize the true potential of the Hudson River Railroad after the Civil War. Without it, New York City would have declined steadily from the 1850s on.

As for Philadelphia, by the mid-1840s, not even the most obscurantist citizen could ignore the fact that its bizarre system of canals and inclined planes to the West was a failure. In 1846 a group of private businesspeople, suspecting correctly that they would later be able to buy at a bargain price the usable rail sections of the "mainline works," secured a charter for what came to be called the Pennsylvania Railroad, and tackled the awesome task of building a railroad over the Alleghenies to Pittsburgh. They were spurred on by an act of the state legislature that granted the Baltimore & Ohio Railroad a charter to build a branch of its line to Pittsburgh if the Pennsylvania Railroad was not in Pittsburgh within ten years--a fate too horrible for the merchants to contemplate. They made it with two years to spare, and the remarkable enterpris

that they had created made them, and three succeeding generations of stockholders, prosperous indeed.

There are a number of reasons that the 1850s became the "miraculous decade" in the development of the American railroad system. The volume of railroad building required unprecedented access to capital. Much of the money needed came from European investors who were looking for opportunities abroad after having been frightened by the Revolutions of 1848. Furthermore, many Americans felt that political stability had been secured by the Compromise of 1850, and they optimistically assumed that the slavery controversy would cease to act as a brake on national development.

The 1850s were a period not only of further building on an vast scale but also of the beginnings, formal and informal, of consolidation of individual lines into a national system. It was clear that the railroad's role was to be far greater than that of a connecting link between navigable bodies of water. Trains were becoming the basic means of transportation regardless of distances involved, difficulty of terrain, and existence of water routes. In 1853, Erastus Corning, whose efficiency in providing upstate New York with railroads had been well motivated by an exclusive contract to sell them iron rails, engineered a merger of numerous short lines into one continuous railroad between Albany and Buffalo. Christened the New York Central, it ranks as the first great corporate merger in U.S. history. At almost the same moment, the Lake Shore & Michigan Southern Railroad, destined to become one of the world's greatest profit machines, had been completed, and through service from New York City to Chicago had begun. The axis thus created was the chief one around which the commerce of North America would revolve for the next century.

The approach of the Pennsylvania Railroad to Pittsburgh stimulated the construction of extensions toward Chicago and St. Louis, and by 1860, the east-west railroad system had assumed the general form that it has had ever since. But the expansion of railroads in Ohio, Indiana, and Illinois in the 1850s was truly remarkable, especially in view of the defaults and outright repudiations of the state bond issues that had been authorized in the 1840s to build railroads. The ironmasters of England and Wales would not have sold these states a single rail on credit, but by 1850, private capital had rushed in and filled the vacuum. Important north-south lines were also built to do the work that it had been hoped canals would be able to accomplish.

At this point, a major shift in federal policy occurred. Nationalistic Democrats such as Stephen A. Douglas, convinced that an America preoccupied with the great work of filling a continent would forget its sectional differences, pushed through Congress the first land grant law. The railroad it helped make possible, the Illinois Central, lived up to its expectations and by 1860 had helped draw the Midwest more tightly into the union than ever before.

Reinforcing this development was the rapid extension of railroads westward from Chicago. In 1856, the Rock Island Railroad, after its brilliant attorney, Abraham Lincoln, had defeated the efforts of river boatmen to prevent it, had built the first bridge across the Mississippi River at Rock Island, Illinois and was heading across the prairies of Iowa. Railroads had reached the east bank of the Mississippi at seven other places, from La Crosse, Wisconsin to St. Louis. The impact of the railroads of the North was felt almost immediately on patterns of interregional trade. No one put it better than New York politician Thurlow Weed, on a trip out West in 1854. As he wrote back to the New York *Tribune*:

> Time is working a phenomenon upon the Mississippi River. In a business point of view, this river is beginning to run upstream! A large share of the products of the Valley of the Mississippi are soon to find a market up instead of down the river. There is a West growing with a rapidity that has no parallel . . . while the railroads that are being constructed from Cincinnati, Toledo, Chicago, &c., to the Mississippi, are to take the corn, pork, beef, &c, &c, to Northern instead of Southern markets.

By 1860, in fact, more than one-half of the cotton crop had deserted New Orleans and other Gulf ports and was being speeded north and east to Atlantic ports entirely by rail. When the Civil War finally broke out, these railroads would play an important role in the outcome and provide a basis for the great westward surge that came afterwards. Not even the South's failure to build East-West railroads of its own (with one exception) was as great blow to her hopes to retain support of the West as was the joining of the Northeast and Midwest by railroads that reached down into southern Illinois and beyond the great river itself.

VI. Conditions on the Railroads

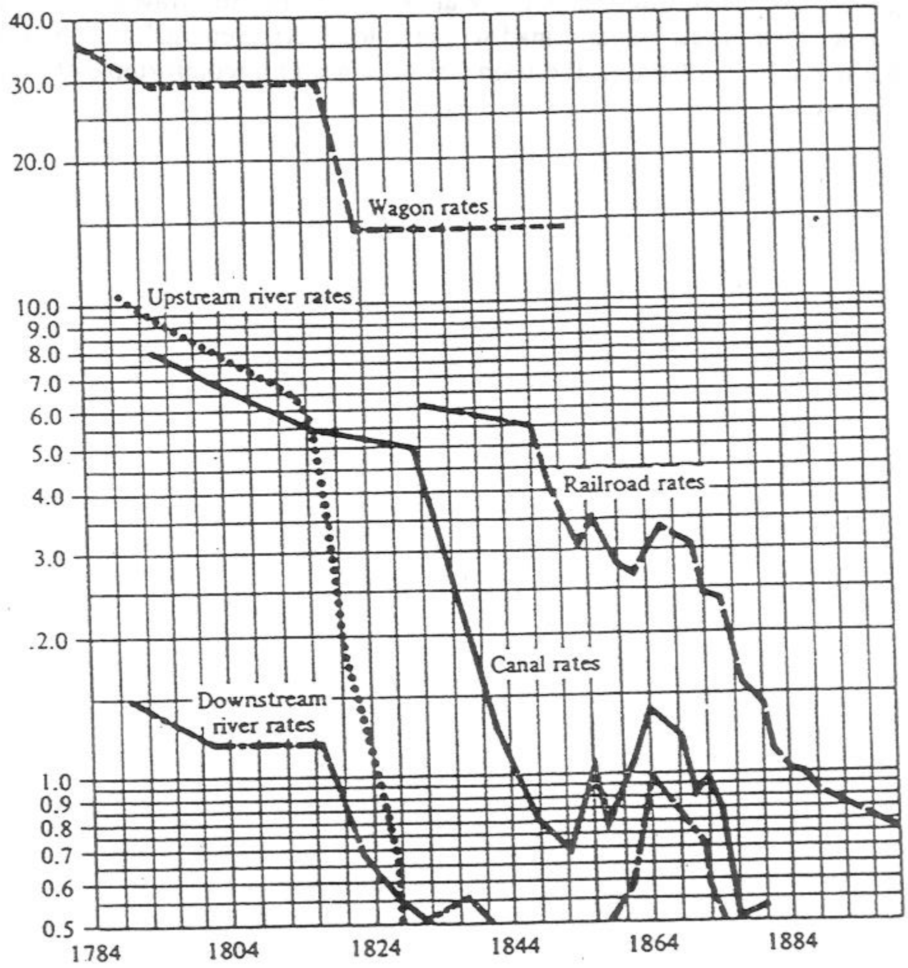
American railroads in 1860 were primitive even by the standards of the next generation. Although the maps accompanying this case appear to show smooth, integrated systems, many routes actually were broken at numerous points. The science of bridge building was still in its infancy, and most river crossings required travelers to take a ferry, although boats that carried passenger and freight cars intact from one bank to the other were widely used. Thus, trains were ferried across the Susquehanna at Havre de Grace on the important Philadelphia-Baltimore line and across the broad Ohio at Cairo, Illinois between the Illinois Central and its southern connection. The city of St. Louis, lulled by its golden days as the most important steamboat town on the Mississippi, did not bestir itself to build a bridge across the river at that point until the 1870s; but Chicago, with its superb location at the foot of Lake Michigan, would have eclipsed it anyway. There was no bridge on the Thames River at New London, Connecticut, until the 1880s; through traffic between Boston and New York moved by an inland route, and the famous "Shore Line" did not come into its own until the end of the century. Most serious of all was the variation in track gauges, especially in the South, which was not finally corrected until the 1880s.

As an occupation, railroad work was grueling and dangerous. The automatic air brake, applied simultaneously throughout the entire train by the engineer, would not make its appearance until the last quarter of the century. Meanwhile, workers scrambled down the catwalks atop box cars, in all kinds of weather, to twist the handbrake wheels when the engineer whistled, "Down brakes!" In the yards, brakemen stood between cars to couple them by means of links and pins before the automatic coupler was finally invented late in the century.

By today's standards, the roadbeds and rails of antebellum lines were almost toylike. Even the best-engineered lines used iron rails that weighed barely a third as much per yard as those of the best railroads of today, reflecting the fact that rails were more expensive in the United States than in England until the use of the Bessemer steel process in the 1870s. Most lines were poorly built, sometimes not with rails at all but iron straps that could pop up, pierce the car floor, and occasionally impale passengers. Speeds of 10 to 15 miles an hour were typical, and speeds of more than 30 miles an hour virtually unknown. Even so, derailments were frequent and did not so much crush the passengers as cremate them when pot-bellied stoves (the only source of

heat in winter) set the wooden cars afire. Collisions—front-end and rear-end—produced appalling results, even after the telegraph began to be used to dispatch trains in lieu of "running by the book." Travelers found few amenities either in railroad stations or aboard trains. Sleeping cars did not come into general use until after the Civil War, and food for the traveler who did not prudently bring his or her own meals meant a mad scramble for "refreshments" at railroad lunch rooms en route. Like the airliner of today, the train was boring and uncomfortable—but far, far faster than any alternative.

Exhibit 1 General Pattern of Inland Freight Rates, 1784-1900 (cents per ton-mile)



Source: Douglass C. North, *Growth and Welfare in the American Past* (Englewood Cliffs, N.J.: Prentice-Hall, 1966), p. 111.

Exhibit 2 Development of the Internal Transport Sector, 1820-1860

	1820	1830	1840	1850	1860
Canal mileage (1,000 miles)	0.2[a]	1.5	3.3	3.7	4.3
Steamboat (western rivers) operating tonnage (1,000 tons)	14	25	83	135	195
Railroad operating mileage (1,000 miles)	-	-	2.8	9.0	30.6

[a]Data for 1821

Sources: Taylor, *Transportation Revolution*, p. 79; U.S. Bureau of the Census, *Historical Statistics*, p. 427; Haites and Mak, "The Decline of Steamboating . . . ," p. 27 as reproduced in Peter McClelland, "Transportation," in Glenn Porter, ed., *Encyclopedia of American Economic History* (New York, 1980).

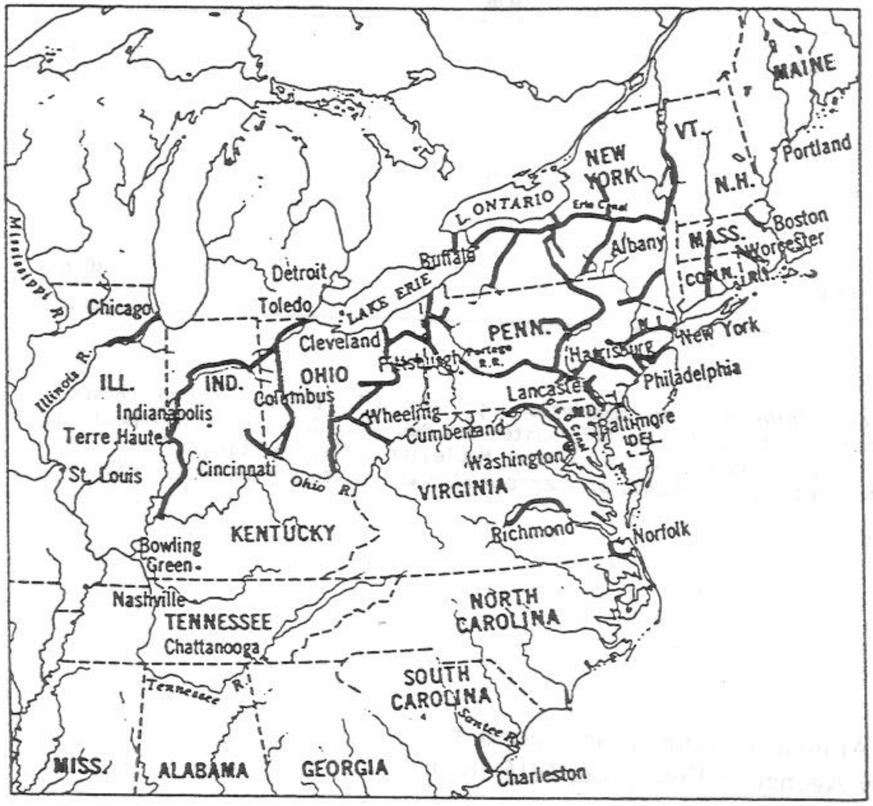
Exhibit 3 Annual Investment in Canals by Region and by Agency of Enterprise, 1815-1860 (millions of dollars)

Year	United States Total (1)	State (2)	Private (3)
1815	a		
1820	$1.1	$0.8	$0.2
1825	2.7	1.5	1.2
1830	7.5	5.1	2.4
1835	3.5	2.0	1.5
1840	14.3	11.3	3.0
1845	2.0	1.1	0.9
1850	4.9	2.3	2.5
1855	5.3	4.2	1.1
1860	1.9	1.4	0.5
Totals, 1815-1860	104.6	121.1	73.5

[a]Less than $50,000

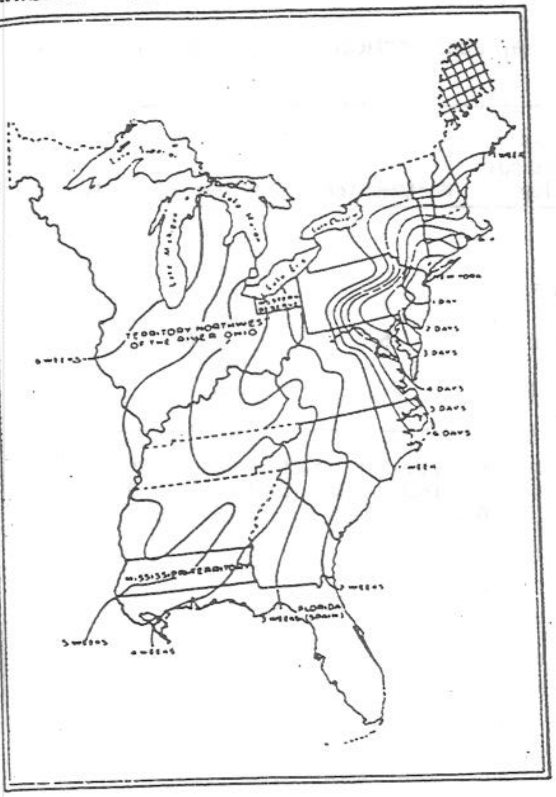
Source: H. Jerome Cranmer, "Canal Investment, 1815-1860" in *Trends in the American Economy in the Nineteenth Century* (Princeton Press), pp. 555-559.

Exhibit 4 Principal Canals Built by 1860

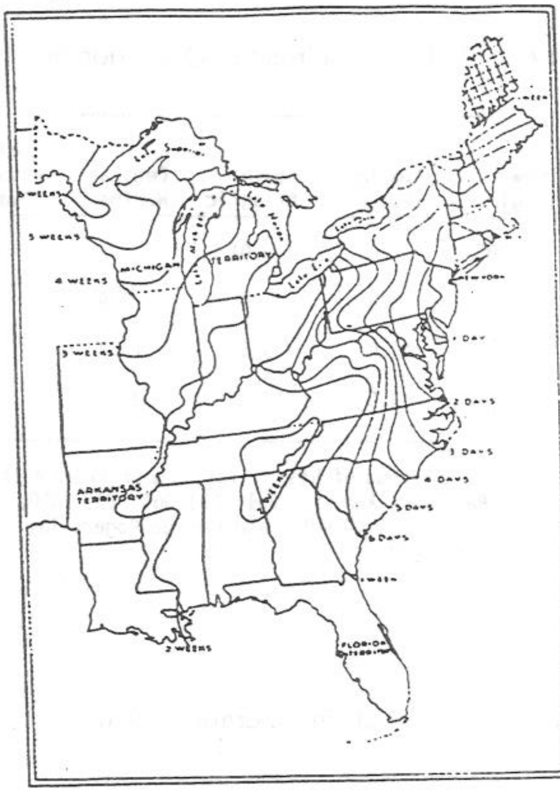


Source: Albert W. Niemi, Jr., *U.S. Economic History: A Survey of the Major Issues* (Chicago, 1975), p. 56.

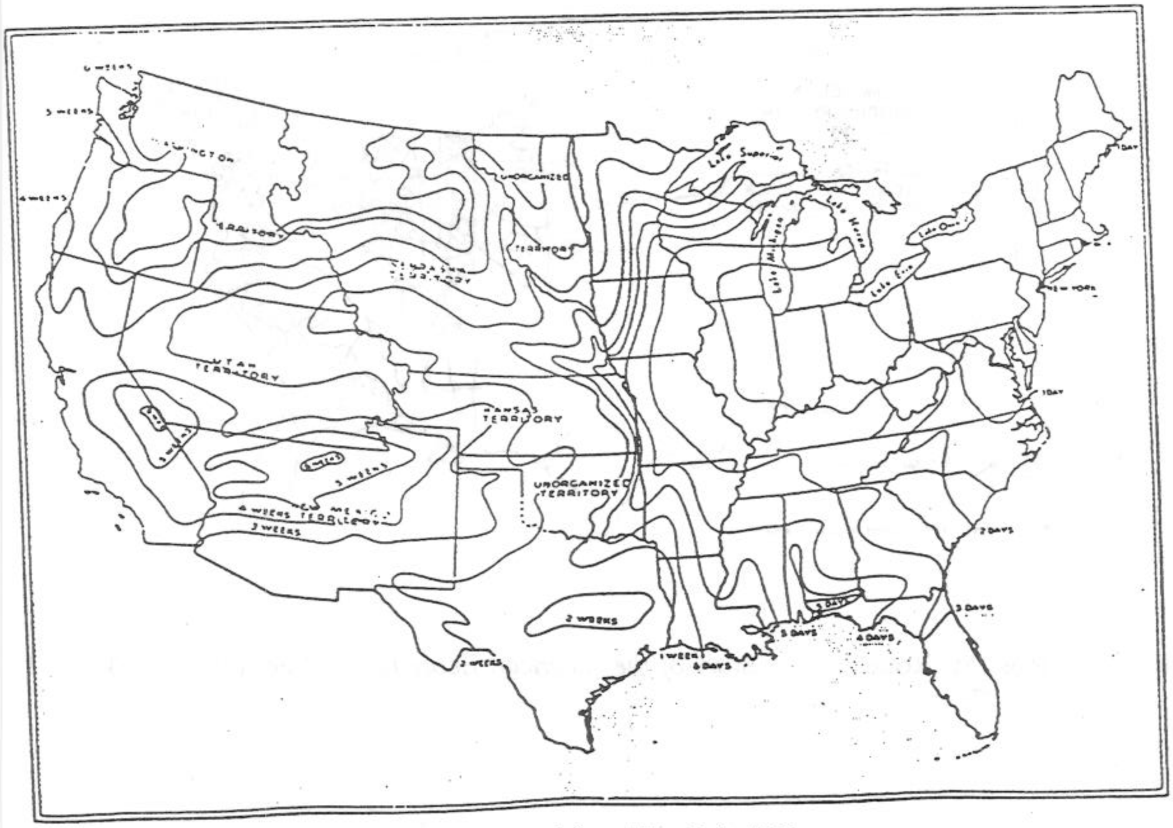
Exhibit 5 Rates of Travel from New York, 1800, 1830, and 1860



Rates of Travel from New York, 1800



Rates of Travel from New York, 1830



Rates of Travel from New York, 1860

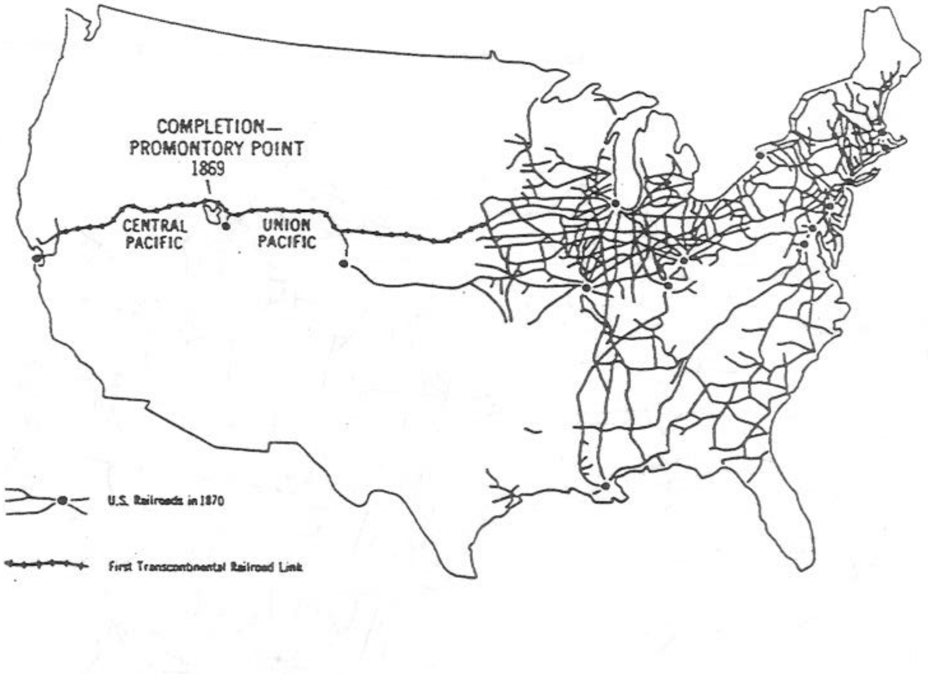
Source: Charles O. Paullin, *Atlas of the Historical Geography of the United States* (Washington, 1932), plate 138 A, B, C.

Exhibit 6 Miles of Railroad in Operation by Geographical Sections, 1830-1900 (thousands)

Year	New England	Middle Atlantic	South Atlantic	Central Northern	Gulf and Mississippi Valley	Northwestern	Southwestern	Pacific
1830	.003	.07	.01	-	-	-	-	-
1850	2.4	2.6	1.4	0.9	0.3	-	-	-
1870	4.5	10.6	6.5	14.7	5.1	5.0	4.6	1.9
1890	6.8	20.0	17.3	37.0	13.3	27.3	32.9	12.0

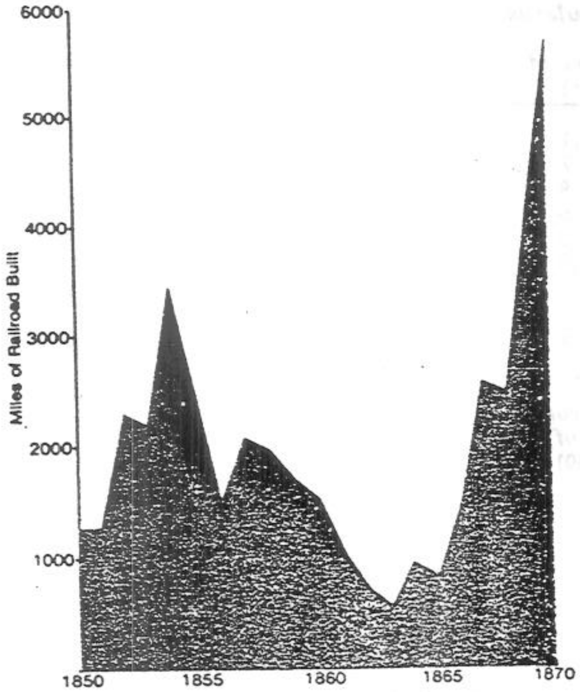
Sources: U.S. Bureau of Statistics, *Statistical Abstract, 1901*, pp. 390-391 (for 1860-1900); *American Railroad Journal* (vol. 23) July 27, 1850, p. 473 (for 1850; *Ibid.*, (vol. 12) March 1, 1841, p. 157 (for 1840); and George Rogers Taylor, *The Transportation Revolution, 1815-1860* (New York, 1951).

Exhibit 7 Railroads in Operation 1870



Source: Ross M. Robertson, *History of the American Economy*, 3rd ed. (New York, 1973), p. 277.

Exhibit 8 Miles of Railroad Built, 1850-1870



Source: Jonathan Hughes, *American Economic History* (Glenview, Ill., 1983), p. 269.

Exhibit 9 Regional Distribution of United States Population, 1808-1880

Region	1800	1820	1840	1860	1880
New England	23.2%	17.2%	13.1%	10.0%	8.0%
Middle Atlantic	26.4	28.0	26.6	23.6	20.9
East North Central	1.0	8.2	17.1	22.0	22.3
West North Central	-	0.7	2.5	6.9	12.3
South Atlantic	43.1	31.8	23.0	17.1	15.2
East South Central	6.3	12.4	15.1	12.8	11.1
West South Central	-	1.7	2.6	5.6	56.7
Mountain	-	-	-	0.6	1.3
Pacific	-	-	-	1.4	2.2
Total Population (millions)	5.3	9.6	17.1	31.4	50.2

Source: Niemi, *U.S. Economic History*, p. 68; U.S. Bureau of the Census, *Historical Statistics of the United States, Colonial Times to 1970* (Washington, 1975), pt. 1, p. 8, ser. 1-5.

Exhibit 10 Urban Growth in the United States, 1790-1890, Old Census Definition (2,500 or more)

			Urban Population
Year	Number of Cities	Population (thousands)	Percent of Total
1800	33	322	6.1
1820	61	693	7.2
1830	90	1,127	8.8
1840	131	1,845	10.8
1850	236	3,544	15.3
1860	392	6,216	19.8
1870	663	9,902	28.2
1880	939	14,130	28.2
1890	1,348	22,106	35.1

Source: Lance E. Davis et al., *American Economic Growth: An Economist's History of the United States* (New York, 1972), p. 601.

Exhibit 11 Percentage of National Output by Industry, 1839-1899

Year	Agriculture	Mining	Manufacturing	Construction
1839	72%	1%	17%	10%
1849	60	1	30	10
1859	56	1	32	11
1869	53	2	33	12
1879	49	3	37	11
1889	37	4	48	11
1899	33	5	53	9

Source: Davis et al., *American Economic Growth*, p. 252.

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5

WHARTON REPROGRAPHICS

The Railroads and the Beginnings of Modern Management (Abridged)

Modern management first appeared in the United States during the second half of the nineteenth century. Many present-day practices and procedures of business administration were originally devised to meet the requirements of operating large new railroads and factories. The purpose of this set of three readings is to probe more deeply into the challenges facing railroads and the solutions that innovative managers provided.

The first selection, dated 1856, contains the earliest writings on business administration published in the United States. It is a detailed report by Daniel C. McCallum, general superintendent of the New York and Erie Railroad (called "The Erie") to that road's president. In it, McCallum outlined the difficulties and problems he faced and the solutions he proposed. The Erie, completed less than five years earlier, was one of the largest railroads in the world. McCallum himself (1815-1878) was an immigrant from Scotland, a bridge engineer, and, in his spare time, a published poet.

After the first large American railroads were built and their original organizational structures put into place, managers began to concentrate on improving control over operations. After the 1850s, the emphasis turned to formulating systems for costing and control. The best known of such systems is described in the second document reprinted here, an excerpt from Albert Fink's famous exposition on cost accounting published in 1874 in the *Annual Report of the Louisville and Nashville Railroad*, a highly successful railroad company of which Fink was president. Fink (1827-1897) had come to the United States from his native Germany during the political unrest of the 1840s. He too was a prominent bridge engineer. Considered a mathematical and organizational genius, Fink became widely known during the nineteenth century as the "Father of Railway Economics."

The third selection is from a memorandum written in 1885 by Charles E. Perkins, president of the Chicago, Burlington and Quincy Railroad, as he was putting into operation a new organizational structure. In the previous seven years, this railroad had grown from a line of

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Professor Alfred D. Chandler, Jr. prepared this case as the basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation.

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500 miles to a system over 5,000 miles in length. Following the model of the Pennsylvania Railroad, Perkins had set up a structure similar to the multidivisional form used today by modern industrials. It included four large autonomous geographical divisions, each headed by a general manager who was responsible for operations and profits and whose activities were planned, coordinated, and evaluated by a president and three vice presidents working out of the General Office and assisted by a general staff. Perkins's memorandum is one of the best analyses of the organization of a large railroad system and the needs that brought it into being that is available from contemporary sources. Perkins himself (1840-1907) was a member of an old new England family and a bold, aggressive innovator.

As you read these three documents, bear in mind that they represent the cutting edge of management at the time, not only in the United States but in the entire world. Also keep in mind the evolving nature of the problems being addressed, and that the three readings were prepared decades apart: the first in 1856, the second in 1874, the third in 1885.

Document #1. *CREATING A MANAGEMENT STRUCTURE: DANIEL McCALLUM AND THE ERIE RAILROAD, 1856.*

Superintendent's Report[1]
Office General Sup't N.Y. & Erie R.R.
New York, March 25, 1856

Homer Ramsdell, Esq.

President of the New York and Erie Railroad Company:

Sir:

The magnitude of the business of this road, its numerous and important connections, and the large number of employees engaged in operating it, have led many, whose opinions are entitled to respect, to the conclusion that a proper regard to details, which enter so largely into the elements of success in the management of all railroads, cannot possibly be attained by any plan that contemplates its organization as a whole and in proof of this position, the experience of shorter roads is referred to, the business operations of which have been conducted much more economically.

Theoretically, other things being equal, a long road should be operated for a less cost per mile than a short one. This position is so clearly evident and so generally admitted, that its truth may be assumed without offering any arguments in support of it; and, notwithstanding the reverse, so far as practical results are considered, has generally been the case, we must look to other causes than the mere difference in length of roads for a solution of the difficulty.

A superintendent of a road fifty miles in length can give its business his personal attention, and may be almost constantly upon the line engaged in the direction of its details; each

1. From Daniel C. McCallum, "Superintendent's Report," March 25, 1856, in *Annual Report of the New York and Erie Railroad Company for 1855* (New York, 1856), pp. 33-37, 39-41, 50-51, 57-59.

employee is familiarly known to him and all questions in relation to its business are at once presented and acted upon, and any system, however imperfect, may under such circumstances prove comparatively successful.

In the government of a road five hundred miles in length a very different state of things exists. Any system which might be applicable to the business and extent of a short road, would be found entirely inadequate to the wants of a long one: and I am fully convinced, that in the want of a system perfect in its details, properly adapted and vigilantly enforced, lies the true secret of their failure: and that this disparity of cost per mile in operating long and short roads, is not produced by a difference in length, but is in proportion to the perfection of the system adopted.

In my opinion a system of operations, to be efficient and successful, should be such as to give to the principal and responsible head of the running department a complete daily history of details in all their minutiae. Without such supervision, the procurement of a satisfactory annual statement must be regarded as extremely problematical. The fact that dividends are earned without such control, does not disprove the position, as in many cases the extraordinarily remunerative nature of an enterprise may ensure satisfactory returns under the most loose and inefficient management.

It may be proper here to remark, that in consequence of that want of adaptation before alluded to, we cannot avail ourselves to any great extent of the plan of organization of shorter lines in framing one of this, nor have we any precedent or experience upon which we can fully rely in doing so. Under these circumstances, it will scarcely be expected that we can at once adopt any plan of operations which will not require amendment and a reasonable time to prove its worth. A few general principles, however, may be regarded as settled and necessary in its formation, amongst which are:

1. A proper division of responsibilities.

2. Sufficient power conferred to enable the same to be fully carried out, that such responsibilities may be real in their character.

3. The means of knowing whether such responsibilities are faithfully executed.

4. Great promptness in the report of all derelictions of duty, that evils may be at once corrected.

5. Such information, to be obtained through a system of daily reports and checks that will not embarrass principal officers, nor lessen their influence with their subordinates.

6. The adoption of a system, as a whole, which will not only enable the general superintendent to detect errors immediately, but will also point out the delinquent.

Organization

The following comprises a list of the principal officers acting directly under the general superintendent, with powers and duties arranged with reference to obtaining the results proposed.

1. Division and branch superintendents
2. Masters of engine and car repairs
3. Car inspectors
4. General freight agent
5. General ticket agent
6. General wood agent
7. Superintendent of telegraph
8. Foreman of bridge repairs

For the more convenient working of the road it is now separated into divisions as follows:

The Eastern Division and Union Railroad extending from Jersey City, to Port Jervis in the county of Orange—88 miles.

The Delaware Division extending from the Port Jervis Station, to Susquehanna Station in the county of Susquehanna, Penn.—104 miles.

The Susquehanna Division extending from the Susquehanna Station, to Hornellsville in the county of Steuben—139 miles.

The Western Division extending from Hornellsville, to Dunkirk on Lake Erie—128 miles.

Newburgh Branch extending from Newburgh, westward, to the intersection with the main line near Chester, in the county of Orange—19 miles.

Piermont Branch extending from Piermont to Sufferns—18 miles.

The several divisions and branches are in charge of superintendents, who are held responsible for the successful working of their respective divisions, and for the maintenance of proper discipline and conduct of all persons employed thereon, except such as are in the employment of other officers acting under directions from this office, as hereinafter stated. They possess all the powers delegated by the organization to the general superintendent, except in matters pertaining to the duties of general ticket agent, general freight agent, general wood agent, telegraph management, and engine and car repairs.

They have authority to change, by telegraph or otherwise, the movement of trains from the times specified in the tables.

Masters of engine repairs are held responsible for the good condition of the engines and machinery in shops, and the cost of their repairs. It is their duty to make frequent and thorough inspection of the engines so as to guard them from accidents and injuries which may result from the want of seasonable and trifling renewals; also to see that the engines are otherwise in efficient condition for use. They are also required to report to the division superintendents all cases they may discover of abuse or maltreatment of locomotives by engineers or dispatchers.

There are eight engine repair shops on the line.... [McCallum identifies the shops and the personnel in charge of them and then outlines the duties of the car inspectors.]

The general freight agent has the supervision of the freight charges. His duties are, with the approval of the president or general superintendent, to make and regulate prices for the transportation of freight; to negotiate contracts and arrangements with individuals and other companies, and to see that such contracts are fairly and equitably complied with. Also, to investigate and examine all claims for damages and losses of freight or baggage, and certify such of them as are found valid, to the general superintendent for approval.

The general ticket agent is required, with the approval of the president or general superintendent, to regulate the prices for transportation of passengers; to negotiate ticket arrangements with other companies, and to supervise all matters connected with the sale of tickets. [McCallum next describes the duties of the general wood agent, the superintendent of telegraph, and the foreman of bridge repairs.]

The above will serve to show the division of the administrative duties upon the line, and the general organization of this department. Each officer possesses all the power necessary to render his position efficient, and has authority, with the approval of the president and general superintendent, to appoint all persons for whose acts he is held responsible, and may dismiss any subordinate when in his judgment the interests of the company will be promoted thereby.

The enforcement of a rigid system of discipline in the government of works of great magnitude is indispensable to success. All subordinates should be accountable to, and be directed by their immediate superiors only; as obedience cannot be enforced where the foreman in immediate charge is interfered with by a superior officer giving orders directly to his subordinates.

It is very important, however, that principal officers should be in possession of all the information necessary to enable them to judge correctly as to the industry and efficiency of subordinates of every grade.

To acquaint themselves in this particular, and remedy imperfections without weakening the influence of subordinate officers, should be the aim of officers of the higher grades.

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It would occupy too much space to allude to all the practical purposes to which the telegraph is applied in working the road; and it may suffice to say, that without it, the business could not be conducted with anything like the same degree of economy, safety, regularity, or

dispatch. The constantly increasing amount of business to be performed by it, has rendered it necessary to put up an additional [telegraph] wire over the Delaware Division, for through messages: and I have no doubt the increase of traffic will soon compel its extension over every portion of the road.

The minimum amount of service consistent with the largest net revenue, is also an important subject for consideration, the proper regulation of which must mainly depend upon data derived from the actual expenses and earnings of each train, as nearly as can be ascertained.

In the economical management of a freight traffic are involved:

First, the most effective use of motive power.

Second, the regulation and reduction of speed to the lowest standard consistent with the exigencies of business.

Third, the means of controlling the movement of rolling stock, that the greatest amount of service may be derived therefrom.

Fourth, the reduction of dead weight,[2] and a corresponding increase of useful load[3] hauled.

By the introduction of a system of reports, and the use of the telegraph, much has been accomplished in obtaining these and other desirable results; and when the telegraphic system shall have become fully matured and carried out, I have the best of reasons for believing that its efficacy will justify the most sanguine expectations.

It would be tasking your patience too much to force the consideration of its details on you at the present time, but as the results of the last year's operations have shown a gratifying reduction in the expenses of the road, and believing as I do, that it is mainly attributable to this cause, I should be doing injustice to my own feelings were I to omit furnishing at least a faint sketch of it.

The powers and duties of the principal officers on the line have been given, and are such as to harmonize in all branches of duty. It will be seen that their subordinates cannot communicate with higher officers, but through them, and can only be communicated with through the same means. There are, however, some exceptions to this rule, as conductors and station agents report, daily, their operations directly to the general superintendent; and it is in a great measure through these means that the business—so far as relates to the movement of trains, the amount of freight carried, and its prompt transmission—is controlled.

2. Weight of cars.
3. Weight of freight.

System of Reports and Checks

Hourly reports are received by telegraph, giving the position of all the passenger and the principal freight trains. In all cases where passenger trains are more than ten minutes, or freight trains more than half an hour behind time, on their arrival at a station the conductors are required to report the cause to the operator, who transmits the same by telegraph to the general superintendent: and the information being entered as fast as received, on a convenient tabular form, shows, at a glance, the position and progress of trains, in both directions, on every division of the road.

The importance of ascertaining the particulars connected with delays cannot be overestimated, as they are frequently the result of mismanagement, are often the primary cause of accidents, and in their history is developed a class of facts and delinquencies which could not be so easily detected in any other way. By these means, the prevailing causes of delays are made known, and an opportunity is given to apply the corrective, where the nature of the case will permit.

The daily reports of passenger conductors give the designating numbers of the engines and cars, the names of the persons employed on the trains, the time of arrival at and departure from the several stations, the particulars in regard to delays, and such other matters of interest as occur on the trip.

The daily reports of freight conductors, in addition to the above, give a general description of the load contained in each car, the place whence taken, where left, and destination as per waybills.

The station agents' daily reports give the time of the arrival and departure of all freight trains at their respective stations; the name of the conductor and number of the engine; the numbers of the cars taken and left, with the tonnage of freight in each; the numbers and kinds of cars remaining at their station, and whether the same be loaded or empty; how many are required for the business of the station, and the nature of that business; and whether any conductor has refused to take cars or freight waybilled to other stations; also, a statement of freight over or short of bills, or damaged or wrongly directed; delays of freight and causes thereof; damaged cars at stations, with particulars as to cause thereof; an accurate daily report of all baggage received and forwarded; from whom received and to whom given; a list of unclaimed baggage remaining on hand at the close of the report; and any other information of interest pertaining to the business of their respective stations.

The division superintendents report monthly the number of miles run, the expense of engineers and firemen, and the quantity and cost of oil, waste, and tallow for each engine on their respective divisions.

The masters of engine repairs report monthly the amount expended for repairs on each engine.

The general wood agent reports monthly the number of cords of wood used by each engine, and the cost of the same.

The information thus obtained is embodied in the statistical accounts kept in this office, and from it we deduce the following:

- the speed of the train between the several stations
- the average load carried in each car
- the tonnage of useful load carried
- the tonnage of cars in which it was transported
- the tonnage of empty returned cars
- the position or location of the cars.

Each of the above items is given for the different trains over the several divisions.

As relates to engines, we obtain for each:

- number of miles run
- cost per mile run for engineer and fireman
- gallons of oil used
- miles run to one pint
- pounds of waste used
- pounds of tallow used
- cost for oil, waste, and tallow
- cost per mile run for oil, waste, and tallow
- cost for repairs
- cost per mile run for repairs
- cords of fuel used
- cost of fuel
- cost per mile run for fuel
- total cost for all of the above items, and
- cost per ton per mile for the same.

The above reports, with others not now enumerated, furnish to the officer at the head of this department, a fund of information, the judicious use of which materially assists in directing the business of the road to the best advantage: but interesting as this information is, in instituting comparisons between the business performed by the several engines and trains and the cost thereof, it is only in its practical application in pointing out the neglect and mismanagement which prevail, thus enabling us to remedy the defect, that its real value consists.

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An experiment referred to in another portion of this report has furnished data for determining the effects of the ruling grades and curvature on each division, and from this data a tabular statement giving the amount of load each engine is capable of moving over the several divisions has been prepared, and we shall be enabled hereafter to observe whether they work up to their capacity. Proper attention to this subject I have no doubt will effect the necessary reform.

The experiment to which I have alluded, furnishes data for determining what ought to be the relative cost of transporting freight over the several divisions, having reference to their grades, alignment and condition; and it is proposed, as soon as the necessary arrangements can be made,

to keep division accounts, with the view of ascertaining how far the actual results agree. This comparison will show the officers who conduct their business with the greatest economy, and will indicate, in a manner not to be mistaken, the relative ability and fitness of each for the position he occupies. It will be valuable in pointing out the particulars of excess in the cost of management of one division over another, by a comparison of details; will direct attention to those matters in which sufficient economy is not practiced; and it is believed, will have the effect of exciting an honorable spirit of emulation to excel.

It will be seen that to some extent the operations on the road are conducted under the directions of officers wholly independent of each other; and it may be thought difficult, under such an organization, to preserve that harmony, in all the branches of duty, which is so essential to success. Subject as they all are to one principal officer, who, as the head of the department, prescribes rules for each, no difficulty need be entertained on this subject; and as a precautionary measure, it is provided that, should any difficulty or misunderstanding arise between division or branch superintendents, general freight agent, general ticket agent, masters of engine repairs, general wood agent, car inspectors, superintendent of telegraph, or either of them, as to the performance of their respective duties, or the relative powers of each, or in reference to the acts of any subordinate of either, copies of all correspondence in relation thereto shall be furnished to the general superintendent, in order that all matters in discussion may be at once adjusted.

It seems to have been generally conceded, that railroad companies have not the same means of controlling the various items of earnings and expenditures, as are within the reach of persons managing the same business but acting in an individual capacity; and whilst it is a humiliating circumstance that railroad companies have not, in many particulars, conducted their business with the same economy as would have been done by private [i.e., owner-managed] enterprise, it by no means proves that they have not the power to do so.

All that is required to render the efforts of railroad companies in every respect equal to that of individuals, is a rigid system of personal accountability through every grade of service.

Document #2. *DEVELOPMENT OF MODERN COST ACCOUNTING, 1874: ALBERT FINK AND THE CLASSIFICATION OF OPERATING EXPENSES.*[4]

Attention is called to the classification of accounts in **Table 1**. [See p. 18 later in this case.] It will be observed that the accounts are divided into three classes:

- maintenance of road, buildings, and general expense, from account 1 to 29
- station expenses, from account 30 to 40
- movement expenses, from account 41 to 74.

4. From Albert Fink, "Classification of Operating Expenses," in Annual Report of the Louisville & Nashville Railroad Company for the year ending June 30, 1874 (Louisville, Ky., 1874), pp. 37-47, 63-64.

The expenditures of each class bear a distinct character, to which I will now refer more particularly.

Those in the first class are not affected by the amount of business transacted, within certain limits to be referred to hereafter. The roadway must be kept in good order. Cross-ties when decayed must be renewed, bridges kept in repair, and a certain organization of officers and men must be kept up, whether one or more trains are to pass over the road.

This class of expenditure per mile of road will vary on different roads according to the permanency of construction, the number of bridges to be kept in repair, the nature of the soil, the climate, and many other local conditions. They will also vary with the amount of business, but only to the extent to which an increase of business requires more extensive accommodation, such as depot-building, side-tracks, etc., which have to be kept in repair. On a road with an established business, and having suitable accommodation for the same, considerable variation in business may take place without affecting this class of expenditures.

The second class of expenditures are incurred at stations in keeping up an organized force of agents, laborers, etc., for the purpose of receiving and delivering freight, the selling of tickets, etc.

One portion of these expenditures does not vary with the amount of business; another portion does. A certain number of agents have to be employed, whether there is more or less work to be done; but the number of persons employed to handle freight may be varied in proportion to the number of tons of freight to be handled. This whole class of expenditures, however, is entirely uninfluenced by the length that either freight or passengers are hauled, or, in other words, by the work of transportation performed. Freight or passengers may be hauled five or two hundred miles, the station expenses incurred on their account being the same.

In the third class of expenditures have been collected all those that vary with the number of trains run.

On the roads on which there is sufficient freight business to fill all trains that are run from one terminus of the road the amount of freight transported will be nearly in proportion to the number of freight train-miles; and hence on such roads this third class of expenditures will be nearly in proportion to the amount of business. It is this class of expenditures alone which possesses that characteristic.

On roads, however, upon which freight-trains have to be run at stated times, whether fully loaded or not, this class of expenditures does not vary with the business, but very nearly with the number of trains run. The expenditures and amount of freight transported in this case are irrelative, the cost of transporting freight being dependent entirely upon the loads as accidentally offered for transportation.

To the three classes of expenditures just named, and which have been shown separately and in detail in [**Table A**], must be added a fourth, not shown [in this table], but which forms a large proportion of the total operating expenses of railroads—viz., the interest on the capital invested.

This class is mainly uninfluenced by the amount of work done. Only so far as an increase of business involves the necessity of additional investments for its accommodation is it influenced by the amount of business.

In the consideration of the subject of the cost of railroad transportation it is of the greatest importance to discriminate between the expenditures which vary with the amount of work performed and those which are entirely independent thereof. The latter form so large a proportion of the total operating expenses of railroads that it becomes impossible to make the amount of work performed a criterion or measure of the cost.

The fixed or inevitable expenses which attach to the operation of railroads, and which are the same whether one or many trains are run over a road, have to be ascertained separately in each individual case. These expenditures are in the nature of a tax upon the business of the road; the smaller the business the larger the tax. What the tax may or should be per ton of freight or per passenger carried in any one case cannot be predetermined by any general rule or law, but can only be ascertained after the two elements on which it depends—1) the fixed expenditures, and 2) the amount of work done—are actually known. These elements vary on all roads; it would be a singular accident to find them alike on any two.

The disregard of these facts in estimating the cost and the value of railroad transportation with a view of judging of the reasonableness of railroad tariffs has led to many erroneous conclusions, which appear to be now fixed in the public mind. It is of great importance to the owners of railroad property at this present time—more so perhaps than heretofore—to possess correct information upon the subject of the cost of railroad transportation. It may therefore not be considered out of place here to show how the cost of transportation varies upon the various roads operated by the Louisville & Nashville Railroad, and the reasons therefor.

The following **Table A** shows the percentage of the four classes of expenditure above referred to, of the total operating expenses on the seven roads operated by the Louisville & Nashville Railroad Company.

Table A

	M.S.	M.L.	N.&D.	K.B.	B.B.	R.B.	G.B.
Movement expenses	41.367	38.589	38.594	22.428	19.490	17.634	28.761
Station expenses	18.161	12.924	12.259	4.367	6.209	5.832	5.007
Maintenance on road	14.453	17.179	17.554	17.964	22.505	17.295	9.361
Interest on investment	26.019	31.308	31.593	55.241	51.796	59.239	56.871
Total	**100.000**	**100.000**	**100.000**	**100.000**	**100.000**	**100.000**	**100.000**

From this table will be seen the great diversity existing in the relative proportions of each class of expenditures.

The movement expenses, the cost of conveying freight from one place to another after it is loaded in the cars—the transportation expenses proper—are 41.3 percent on the Main Stem, and only 17.6 on the Richmond Branch, of the total operating expenses. We have therefore in

one case 58.7, in the other 82.4 percent of the total operating expenses, which are entirely uninfluenced by the amount of work performed as measured by weight and distance, or ton-miles.

The station expenses vary from 4.3 percent on the Knoxville Branch to 18.1 percent on the Main Stem of the total operating expenses.

The cost of maintenance of road is 9.3 percent on the Glasgow Branch and 22.5 on the Bardstown Branch.

The interest account is 26 percent on the Main Stem, and 59.2 percent on the Richmond Branch.

With such great variations in the constituting elements of the cost of transportation uniformity in the final results cannot be expected.

Causes of Difference in Cost of Transportation

I will now compare the expenditure of each class per ton-mile on the seven roads, and show more particularly the reasons for the great difference in cost.

The following **Table B** shows each class of operating expenses per ton-mile on the seven roads operated by the L. & N. R.R. Co.

Table B Cost per ton-mile (in cents)

	M.S.	M.L.	M.&D.	K.B.	B.B.	R.B.	G.B.
Movement expenses	.7365	.8102	.9787	.9364	1.5039	1.6934	5.4928
Station expenses	.3233	.2714	.3109	.1823	.4791	.5601	.9563
Maintenance of road	.2573	.3607	.4451	.7499	1.7366	1.6608	1.7877
Total operating expense	**1.3171**	**1.4423**	**1.7347**	**1.8686**	**3.7196**	**3.9143**	**8.2368**
Interest	.4633	.6574	.8011	2.3061	3.9968	5.6887	10.8615
Total operating expenses and interest	**1.7804**	**2.0997**	**2.5358**	**4.1747**	**7.7164**	**9.6030**	**19.0983**

Movement expenses (comprised of items 41-73 [**Table 1**]). It appears that on the first four roads this class of expenditures varies from .73 cents to .97 cents per ton-mile; on the last three named from 1.50 cents to 5.49 cents per ton-mile. The first four roads belong to that class on which fully loaded freight-trains can be started from one terminus of the road; on the last three named trains are started at regular times, regardless of the amount of load that is to be carried. Hence we find greater agreement in the cost of moving one ton one mile on the first four roads than on the latter, on which the cost depends altogether upon accidental causes.

If on the first four roads the grades, curves, and the cost of labor and material were the same, and also the character of the business, then the cost per ton-mile should be the same; but

as these elements of cost differ, uniformity in the cost even in the movement expenses cannot be expected.

The character of the business of a road has a great influence upon the cost of transportation.

We find the average trainload carried on the first four roads, and the movement expenses per ton-mile, as follows:

	M.S.	M.L.	N. & D.	K.B.
Average trainloads (in tons)	135	113	96	77
Movement expenses per ton-mile (in cents)	0.73	0.81	0.97	0.93

On the Main Stem the average net load carried per train is nearly twice as much as on the Knoxville Branch.

On the first-named road a large amount of freight is carried over its whole length; while on the latter, which is a mere local road, it only passes over a portion of its whole length. The capacity of the locomotive and train cannot therefore be as fully utilized on the latter as on the former road.

On the Main Stem the tonnage in one direction is 73 percent of the tonnage on the other direction, while on the Knoxville Branch it is only 21 percent; hence more empty cars have to be run on the latter than on the former road.

The result in that an average of 135 tons of freight is being carried per train on the Main Stem, while only 77 tons can be carried on the Knoxville Branch; yet the same attention is paid on both roads to secure maximum loads to each train.

It is the character of the business peculiar to each road that brings about this great difference, which, of course, influences the cost of transportation.

On the roads on which there is not sufficient business to secure full loads in the movement expenses per ton is found still greater.

The following table shows the average loads carried in the trains of the three branch roads, and the cost per ton-mile for moving the freight.

	B.B.	R.B.	G.B.
Average number of tons freight carried on one train	18.2	24.0	4.9
Movement expenses per ton-mile (in cents)	1.5	1.7	5.5

It is on account of the small loads carried on the Glasgow Branch per train (4.9 tons) that the movement expenses are so much larger than on the other branches, on which the trains carry from 18.2 to 24 tons.

Station expenses (items 30-40 [**Table 1**]). The elements controlling the cost per ton-mile for station expenses are:

a. The cost of handling one ton of freight—for loading, unloading, clerking, agents' salaries, depot expenses, switching, etc.

b. The length of haul.

Supposing that the cost of handling freight per ton were the same on all roads and at all stations of a road, then the cost per ton-mile of freight would vary according to the length of haul. For each particular length of haul there would be a different cost per ton-mile for this service.

. . . The average cost of station expenses per ton of freight handling on the Main Stem of the road is 23 cents per ton. For freight that passes over the whole length of the line, say between Louisville and Memphis, the cost per ton-mile would be $2 \times 23/377 = 0.12$ cents, and for freight carried only five miles it would be $2 \times 23/5 = 9.2$ cents. We have therefore a difference between the cost per ton-mile from 0.12 to 9.2 cents, although the actual cost of performing the work was the same in both cases; thus showing that the ton-mile is not a proper unit of measure of cost of this service.

But there is even considerable variation in the cost of handling one ton of freight at various stations. . . .

. . . Dividing the number of tons into the number of ton-miles gives the average haul, and dividing this into the cost per ton for handling gives the average cost per ton-mile for handling freight.

For example, take Brooks Station. Number of tons of freight received and forwarded . . . 654: freight to and from Brooks Station was carried 14,335 miles, therefore the average haul 14,333/654 = 21.8 miles; station expenses per ton at Brooks Station . . . 71 cents; cost per ton-mile 71/21.8 = 3.26 cents. To this has to be added the expenses at the station from or to which the freight was forwarded.

If both stations are known, the cost per ton-mile for station expenses can be readily ascertained. . . . For example, for freight shipped between Louisville and Brooks Station, distance 9.2 miles:

	(in cents)
Stations expenses at Brooks Station per ton	71.0
Station expenses at Louisville per ton	24.3
Total cost per ton	**95.3**

Length of haul, 9.2 miles; cost per ton-mile 10.4 cents.

This example sufficiently illustrates the great variety in cost, and the impossibility of making the ton-mile the measure of cost of or compensation for this service. The ton handled would be a more correct measure, although there is necessarily much variety even in this cost, as we have seen. . . .

It must therefore be evident that it is impossible to predetermine the cost per ton-mile of freight for handling without taking into consideration the length of the haul and the conditions under which the station service has to be performed.

Maintenance of roadway and general expense (items 1-29). The two elements that determine the cost per ton-mile for this service are:

1. The cost of maintaining one mile of road, etc., during a given time.

2. The number of tons of freight passed over it during the same time.

The former differs on each road, and so does the latter; hence uniformity in cost per ton-mile is impossible.

The following table shows the cost of maintenance of roadway and general expense per mile of road on the seven roads operated by the Louisville & Nashville Railroad Company during the last year, and the average number of tons of freight passed over one mile of each road; also the cost per ton-mile:

	M.S.	M.L.	N.&D.	K.B.	B.B.	R.B.	G.B.
Cost of maintenance of road per mile per year Table 1, item 29)	$1,857.87	$1,142.25	$1,243.49	$906.76	$436.69	$436.61	$262.73
Tons of freight passed over one mile of road	433,662	152,273	143,378	72,436	11,538	16,656	6,137
Cost per ton-mile (in cents)	0.26	0.36	0.44	0.75	1.74	1.66	1.78

Part of the cost of maintenance of roadway and buildings is chargeable to the passenger traffic. The division of charges between the two classes of traffic has been made in proportion to train-miles. It follows from this that the cost per ton-mile of freight is in a measure affected by the relative use made of a road by the passenger and freight traffic.

From this statement will be noticed the great difference in cost of maintaining one mile of road, buildings, etc. On the Main Stem this cost is $1,857.87, on the Glasgow Branch $262.73 per mile.

An examination of the items from 1 to 28 will show in what particulars these differences occur. A few may be mentioned here. The cost per mile on the Main Stem and Glasgow Branch is as follows:

	M.S.	G.B.
Renewal of ties	$ 368.89	$ 32.96
Bridge superstructure	250.26	25.14
Ditching	69.23	26.06
General expense	346.14	-
Salaries, insurance and taxes	100.40	-

The difference in cost in these five items on the Main Stem and Glasgow Branch is $1,050.76 per mile of road. Part of this great difference is caused from the fact that on one road greater expenditures were made during this year than was due to the year's business: on the other road less. It will be remembered that the yearly depreciation of cross-ties on the Main Stem was found to be for 16½ years at the rate of $257.11 per mile, while during the past year there was expended $368.89 on the Main Stem, and on the Glasgow Branch only $32.96 per mile; the first sum more, the latter considerably less than is required to make good a year's depreciation.

There are great differences in other expenses, such as repairs of bridges, on the two roads. On the Main Stem, as has been mentioned before, the cost of bridge repairs during the last year was unusually heavy, while on the Glasgow Branch, with only one small bridge, the cost is very small. The general expenses of administration on the Main Stem are not incurred on the Glasgow Branch, which is also exempt from taxation. Hence the great difference in cost of maintenance of road and buildings and general superintendence between the two roads.

When we examine into the differences existing in regard to the amount of business transacted in one year over one mile of road—the other element named which enters into the cost of one ton per mile—we find the variation still greater. On the Main Stem 433,662 tons, on the Glasgow Branch only 6,137 tons, pass over one mile of road per year. We can therefore not be surprised that the cost on the Main Stem for maintenance of road is only one-fourth of a cent per ton-mile and on the Glasgow Branch 1.8 cents.

Interest account. The original cost of the road and the rate of interest form one element and the amount of business transacted the other which determines the cost per ton-mile.

The cost of roads per mile and the business transacted over the same vary so much that the cost per ton-mile for interest cannot be expected to be the same in any two cases.

It is impossible to predetermine what is a proper charge for interest on any particular road until these elements—viz., the cost of road and the amount of business—are known.

On the Main Stem of the Louisville & Nashville Railroad, dividing the number of ton miles of freight carried into the interest chargeable to the freight business, the cost per ton-mile is 0.46, while on the Richmond Branch it is 10.86 cents, over twenty times as much. On the five other roads the interest charge varies from 0.65 to 5.7 cents per ton-mile. (For further particulars refer to **Table B.**)

We have now considered the variation in each class of expenditures and the causes therefor per ton-mile. When we find so much variation in the elements which make up the cost of transportation we cannot expect to find uniformity in the total cost.

From **Table B** it appears that the variation in the total cost per ton-mile is from 1.78 cents on the Main Stem to 19.09 cents on the Glasgow Branch. The work performed—viz., the movement of one ton of freight one mile—is the same on all roads, yet the cost of performing is ten times more on one road than on the other.

Great as this variation is on the seven roads under the same management, the variation of the cost per ton-mile is still greater even on the same road, depending as it does upon the different conditions under which the service has to be performed. It would lead here too far to thoroughly analyze the cost of railroad transportation in all its details, and I will only state that a careful investigation shows that under the ordinary conditions under which transportation service is generally performed the cost per ton-mile in some instances may not exceed one-seventh of a cent and in other will be as high as 73 cents per ton-mile on the same road. The lower cost applies to freight carried in cars that otherwise would return empty; the higher cost to freight in small quantities carried short distances.

It is impossible to predetermine the cost of carrying freight on any one road unless the conditions under which it is to be carried, as far as they affect the cost of transportation, be previously known.

In order to estimate the cost of transportation under the various conditions that occur it is necessary to classify the expenditures, and to separate those that increase with the amount of work done from those that are fixed and independent of it; and to ascertain the ratio of increase of cost with the increase of work. Without such an analysis of the cost it is impossible to solve the question of cost of transportation that arises in the daily practice of railroad operation. A mere knowledge of the average cost per ton-mile of all the expenditures during a whole year's operation is of no value whatever in determining the cost of transporting any particular class of freight, as no freight is ever transported under the average condition under which the whole year's business is transacted. We can therefore not make the average cost per ton-mile the basis for a tariff, if it is to be based upon cost; but we must classify the freight according to the conditions affecting cost of transportation, and ascertain the cost of each class separately.

Table 1 Heading of Accounts

Maintenance of Roadway and General Superintendence

Roads repairs per mile of road

1. Adjustment of track
2. Ballast
3. Ditching
4. Culverts and cattleguards
5. Extraordinary repairs, slides, etc.
6. Repairs of hand and dump cars
7. Repairs of road tools
8. Road watchmen
9. General expense of road dept.
10. Total
11. Cross-ties replaced, value
12. Cross-ties, labor replacing
13. Cross-ties, train expenses hauling
14. Total cost of cross-ties per mile of road
15. Bridge superstructure repairs
16. Bridge watchmen
17. Shop building repairs
18. Water station repairs
19. Section house repairs
20. Total cost of bridge and building repairs per mile of road
21. General superintendence and general expense of operating department
22. Advertising & soliciting passengers and freight
23. Insurance and taxes
24. Rent account
25. Total per mile of road
26. Salaries of general officers
27. Insurance & taxes, & general expense
28. Total per mile of road
29. Total cost per mile of road for maintenance of roadway and buildings

29½ Total cost per train mile for maintenance of roadway and buildings

Station Expenses per Train Mile

30. Labor loading & unloading freight
31. Agents and clerks
32. General expense of stations, lights, fuel, etc.
33. Watchmen and switchmen
34. Expense of switching, engine repairs, engineers' and firemen's wages, expense in engine house
35. Total per train mile
36. Stationery & printing
37. Telegraph expenses
38. Depot repairs
39. Total per train mile
40. Total station expenses per train mile
41. Adjustment of track
42. Cost of renewal of rails-value
43. Labor replacing rails
44. Train expenses hauling rails
45. Joint fastenings
46. Switches
47. Total cost of adjustment of track & replacing rails per train mile
48. Locomotive repairs
49. Oil & waste used on locomotives
50. Watching and cleaning
51. Fuel used in engine house
52. Supervision and general expense in engine house
53. Engineers' and firemen's wages
54. Total engine expenses per train mile
55. Conductors and brakemen
56. Passenger car repairs
57. Sleeping car repairs
58. Freight car repairs
59. Oil and waste used by cars
60. Labor oiling & inspecting cars
61. Train expenses
62. Total car expenses per train mile
63. Fuel used by locomotives
64. Water supply
65. Total fuel & water expense per train mile
66. Damage to freight and lost baggage
67. Damage to stock
68. Wrecking account
69. Damage to persons
70. Gratuity to employees
71. Fencing burned
72. Law expenses
73. Total per train mile
74. Total movement expenses per train mile
75. Grand total for maintenance and movement per train mile.

Table 2 Formula for Ascertaining the Cost of Railroad Transportation per Ton-Mile

$$\text{Movement expenses per ton-mile} = \frac{\text{Movement expenses per train mile (items 41 to 74)}}{\text{average number of tons of freight in each train}} = a$$

$$\text{Station expenses per ton-mile} = \frac{\dfrac{\text{Cost of handling freight (items 30 to 40)}}{\text{at forwarding station + at delivery station}}}{\text{length of haul}} = b$$

$$\text{Maintenance of road per ton-mile} = \frac{\dfrac{\text{Cost of maintenance of road per mile}}{\text{per year (items 1 to 29)}} \times \dfrac{\text{total miles run-by freight trains per year}}{\text{total revenue trains, pass. \& freight per yr.}}}{\text{average number of tons of freight transported over one mile of road per year}} = c$$

$$\text{Interest per ton-mile} = \frac{\dfrac{\text{Cost of road}}{\text{per mile}} \times \dfrac{\text{rate of interest per annum}}{100} \times \dfrac{\text{number of freight-train miles per year}}{\text{number of revenue-train miles.}}}{\text{average number of tons of freight transported over one mile of road per year}} = d$$

Total cost per ton-mile = a + b + c + d

In order to make use of this formula it is necessary to know . . . fifty-eight items of expense (above), all of which vary on different roads, and enter into different combinations with each other. Some of the items of movement expense (41 to 74) change with the weight of trains, and have to be ascertained in each individual case. The average cost for the year can be made the basis of the estimate. Besides the items shown (above), the following other items enter into the calculation: the average number of tons of freight in train per mile of the round trip of the train, the average length of haul, the number of miles run over the road with freight and passenger trains per annum, the cost of the road, the rate of interest, and the total number of tons of freight carried during a year over one mile of road. Without these data it is impossible to make a correct estimate of the cost of transportation on railroads.

Document #3. *CHARLES E. PERKINS AND THE ORGANIZATIONAL DESIGN OF A GREAT RAILROAD SYSTEM, 1885*[5]

Obviously there is a limit to the proper growth of any single unit of management under one general manager. Where the proper limit is will depend upon circumstances.

A road 500 miles long as to its main stem may have 1,500 miles of branches, and the whole may be of such a character as to make it almost necessarily one unit for the purpose of operation. Anywhere from 250 to 2,000 miles may be operated successfully as one unit under a general manager. . . .

An important question in the management of a large railroad system is how to get local responsibility on the part of those engaged in operating different arms of the system.

It is obvious that to hold a manager responsible for results it is necessary to give him pretty full power over the property which he must use to produce those results, both as to income and outgo. It is also clear that to get this kind of responsibility it is desirable that the unit of management, so to speak shall not be too large, and that it shall be homogeneous. That is to say one manager with his necessary staff having control of the every day details of business must not have too large a field or too many roads differing in character. On the other hand it is desirable and economical to have uniformity in many things and not to cut the system up into too small pieces locally independent of one another. The unit of management being determined the officer in command should in order to keep himself and his men up to their work be able to know at all times what his road is earning and what he is spending—and he should have the responsibility for a loss of business as well as for an excess of expenditure.

Experience shows that where branches or side lines are operated under the same local management as that for the through, or main line, the inevitable tendency is to do things on the branches in the same way as on the main line, which is often a more expensive way than is really necessary for a branch.

Also as regards wages: on a through line with a large and unsteady volume of business where 1,000 men are employed one month and 800 the next wages are fixed at an average point high enough to attract the best *class* of men to be had under the circumstances for the work to be done. Whereas on small roads where few men are employed and the work is steady and less wearing, and they can be selected by the superintendent himself and are drawn mostly from the fixed population along the line of the road the few required can generally be obtained at lower wages than the average paid by a big road.

5. From a memorandum of Charles E. Perkins, "Organization of Railroads," written in 1885, from the personal papers of Charles E. Perkins, president of the Chicago, Burlington and Quincy Railroad, 1881-1901 © 1965 by Richard C. Overton. Printed by permission.

It is always difficult however to pay one rate of wages on the main line, and another rate on a branch line, where one management operates both. Theoretically it can be, and sometimes is done to some extent, but the drift is always strong in the direction of pushing up the branch wages to the same level as the main line, when the two are operated as one road. With short branches which are run merely as feeders to the main stem, this evil can hardly be overcome.

A branch too short for a superintendent of its own, is put in charge of the force operating the part of the main line contiguous to it, and men are almost of necessity changed about from the branch to the main line and vice versa, either because trains run through sometimes over the branch and part of the main line, or for other reasons. But when it is practicable to group a sufficiently large mileage of second class or "branch" road to justify it, it is clearly desirable to separate the local management from that of the main line, even if it can be conveniently done, to the extent of making a distinct unit of management.

A railroad system owned by one company may therefore embrace one or more units of managements, each under a general manager responsible directly to the president and the 3rd vice president and one or more smaller units of management embracing roads in the first stage, each under a general superintendent also responsible directly to the president and the 3rd vice president. Each unit may also if thought expedient have its own accounting office at the head of which would be a local auditor, and its own money office with a local treasurer in charge, and both of these officers would through the auditor and the treasurer respectively be responsible to the 2nd vice president.

By thus operating the property each unit can receive the kind of management most economical under the circumstances and details will receive an amount of attention from the respective general managers or general superintendents which could not be given if one management were put over the whole and the different heads of departments on the general manager's staff made responsible over so wide a field.

The general idea of the plan of management suggested, is that whatever the size of the unit and however many units may be owned by one company, the general organization would not be changed.

The president assisted by the three vice presidents could take care of an indefinite number of units if they keep clearly before them the necessity of local self-government.

By local self-government is meant the possession of very full powers by each general manager or general superintendent as the case may be.

The accounts of two or more units may with proper system be kept in one place and under one general auditor, but if that is done, they should be kept distinct so that each general manager or general superintendent, may be held responsible for his results independently.

The importance of not letting the unit of management become either too large or too heterogeneous is so great that it may sometimes be found expedient in acquiring a new road to continue to operate it under its own corporate organization.

When the consolidation of railroads began it was supposed and argued that one of the things to be gained by it would be the saving of the necessary cost of maintaining separate corporations and general offices.

This was true within limits—two roads each 100 miles long and each maintaining its corporate organization and staff could with economy in the general offices be put together under one set of officers throughout. But this is not true in the same degree of two roads each 1,000 miles long.

And when one general manager, responsible to those over him for the general results, has been charged with the daily supervision of 2,000 miles of railroad he has reached about the limit of physical ability. The amount of necessary attention to details is enormous. It would generally produce better results to limit one man to about 1,000 miles, but with the growth of the large systems and the complications of the business management it has been found in some cases difficult if not impractical to do this. No line however should be rigidly drawn, as it well can be in almost all cases, at about 2,000 miles, and as much less than that down to 1,000 as the circumstances will admit of.

It is sometimes urged against this division of one great property into units of management, that there constantly arise general questions affecting the whole property—that the different operating units will clash and money will be lost to the company owning the whole by reason of efforts on the part of one general manager to get some advantage over another—that the use of red tape will become too much extended—that car mileage offices and other offices will be unnecessarily multiplied, etc. But the simple answer to all this is that the gain by reason of the more efficient attention to details on the part of the man responsible for results will be far greater than any possible loss by the unnecessary use of red tape, etc.

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6 WHARTON REPROGRAPHICS

Jay Gould and the Coming of Railroad Consolidation

Introduction

Before 1880, few American railroads had grown to great size. The Pennsylvania Railroad and the Baltimore & Ohio Railroad had built their systems in the 1870s, but other roads had not followed their example. Nearly all rail executives still agreed that a line of over 500 miles was too costly to finance and too complex to manage. Instead of expanding their operations, they preferred to assure a continued flow of traffic over their lines by making alliances with connecting and competing roads.

Suddenly, early in the 1880s, these executives changed their minds. Within a decade afterwards, the American railroad network had become dominated by a few huge railroad systems, each operating several *thousand* miles of track. The person most responsible for this sudden basic change in the strategy of American railroads was Jay Gould, one of the most important figures in American business history, and perhaps *the* most controversial. As a recent biographer notes,

> In his own time Jay Gould became known as the most hated man in America. It is not an honor most men seek, let alone relish, nor is it easily cast off once bestowed. For most of Gould's life, the taunting curses of his critics followed him like the tinkle of the leper's bell. Two generations of operators, businessmen, bankers, lawyers, coupon clippers, stockholders, politicians, reformers, journalists, ministers, and other guardians of the public morals reviled him as the supreme villain of his age. Even those who admired Gould's genius often did so with a mixture of awe and revulsion, as if fascinated by the movements of some exotic but deadly predator.

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*Professor Alfred D. Chandler, Jr. originally prepared this case. The principal sources are Julius Grodinsky, **Jay Gould: His Business Career** (Philadelphia, 1957) and Alfred D. Chandler, Jr. and Stephen Salsbury, "The Railroads: Innovations in Modern Business Administration," in Bruce Mazlish, ed., **The Railroads and the Space Program** (Cambridge, 1965). Professor Thomas K. McCraw revised and abridged the case, drawing on material in Maury Klein, **The Life and Legend of Jay Gould** (Baltimore, 1986).*

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> It is difficult to exaggerate the depth of vituperation heaped on Gould by his contemporaries. [His former associate] Daniel Drew said of him simply, "His touch is death." James R. Keene, another operator, denounced Gould as "the worst man on earth since the beginning of the Christian era. He is treacherous, false, cowardly and a despicable worm incapable of a generous nature." Editors reserved their choicest insults for Gould. Joseph Pulitzer called him "one of the most sinister figures that have ever flitted bat-like across the vision of the American people."[1]

A review of the complex role played by Gould provides an opportunity to analyze the nature of competitive strategy, finance, and top-level decision making in nineteenth-century railroading, the world's first big business.

The Policy of Alliances

The 1850s had witnessed the first great railroad boom, which by 1860 provided the country with over 30,000 miles of track and its basic rail network east of the Mississippi River. The Civil War (1861-65) slowed construction, but with the war's end came another railroad building boom that lasted until the depression of 1873. In these same years the volume of traffic rose impressively, particularly along the great east-west routes of trade. Individual railroad companies joined with connecting and competing lines to make agreements on traffic movements and rates charged on through traffic.

This policy of alliance was worked out most systematically by those roads on the nation's central transportation routes connecting the Mississippi Valley with the Atlantic seaboard. Between 1851 and 1854 the four east-west trunk lines had been completed to their original destinations in the "West"—the Erie Railroad in 1851, to Dunkirk, New York; the Baltimore & Ohio in 1853 to Wheeling, in the western part of Virginia; the New York Central in 1853, to Buffalo; and the Pennsylvania in 1854, to Pittsburgh.

In the autumn of 1854, the presidents and general superintendents of these lines and other east-west railroads gathered at the St. Nicholas Hotel in New York City. They met, the Pennsylvania's president told his stockholders, "with a view to agreeing upon general principles which should govern railroad companies in competing for the same trade and in preventing ruinous competition. . . ."[2] At a series of meetings the roads defined general principles of rate making and freight classification and determined what part of the total through rates each road on that route should receive. Similar agreements were made among roads in New England and among the new roads in the Midwest. Yet the rates decided on were rarely maintained. Pressure to cut them was too strong and sanctions to maintain them too weak. Then came the Civil War and the postwar boom, which, for more than a decade, provided almost enough traffic for all, making the need for formal alliances between competing roads less necessary.

Alliances between connecting lines proved more enduring than those between competing ones. The Pennsylvania was one of the first to strengthen such alliances by acquiring stock in its connecting roads. As its able president, J. Edgar Thomson, told the road's stockholders in January 1858:

1. Maury Klein, *The Life and Legend of Jay Gould* (Baltimore, 1986), p. 3. Klein goes on to argue that Gould's actual role and function in the American economy have been badly misunderstood.
2. *Eighth Annual Report of the Directors of the Pennsylvania Rail Road Company* (1855), p. 13.

> It has been the policy of this company to aid in the construction of Western Railways designed to facilitate trade to and from its road, and to avoid serious inconveniences and losses to its freighting business from the uncertain character of the navigation of the Ohio River. With this object in view, assistance has been extended to the Pittsburgh, Fort Wayne and Chicago, the Steubenville and Indiana, and the Marietta and Cincinnati Railroad Companies.[3]

This investment, Thomson continued, had already reached over $1,600,000. Begun in 1852, the policy received legal sanction by the Pennsylvania legislature, which passed an act in 1853 permitting the company "to subscribe capital, or guarantee bonds of other companies, to the extent of 15 percent of its paid up capital." This act, as one of the earliest laws allowing a company to hold the stock of another doing the same business, helped to introduce the holding company, a legal device that became essential to the growth of large businesses. Besides obtaining allies to the west, the Pennsylvania also made agreements setting rates and providing for mutual use of facilities with roads connecting Philadelphia and other Pennsylvania cities with New York City.

In the East, the Baltimore & Ohio closely followed the example of the Pennsylvania, making similar investments in and alliances with its connecting lines in the Ohio Valley. The Erie Railroad did less, partly because the speculators who had moved onto its board were not interested in the long-term health of the road, and partly because its major connection, the Atlantic and Great Western, was already financed by a wealthy British group and did not need the Erie's financial support. The New York Central relied on another tactic. It purchased stock in the American Express Company and other fast-freight lines and used them to bring traffic to its roads.

In the West, new roads pursued the policy of investing in feeder lines even more extensively than did the Pennsylvania. The Boston investors who financed the completion of the Michigan Central into Chicago also organized and founded the Chicago, Burlington and Quincy, running west from Chicago to the Mississippi. The New York group that revived the Michigan Southern financed the Rock Island line to assure their western traffic. Both groups soon were financing the construction of tracks across Iowa. In the same manner the Illinois Central and the Chicago and Northwestern supported their connecting lines.

Even though these companies tried to cement their relationships by stock purchases, the alliances rarely remained stable. The younger lines grew larger, more prosperous, and increasingly independent. Financial strain in times of recession, the personal ambitions of their promoters, and a desire to keep alternative traffic routes available often led these allies to threaten to join with other roads.

Nevertheless, railroad managers and directors continued to prefer a policy of alliances to that of purchase and outright control of connecting and competing lines. Consolidation presented complex financial, administrative and even ideological challenges. The investors on the boards were fearful of the high costs of a policy of consolidation. Operating executives were troubled by the difficulty of managing a road more than 500 miles long. The president of the Pennsylvania saw still another disadvantage of great size. In 1871, he told his stockholders that:

3. *Eleventh Annual Report of the Board of Directors of the Pennsylvania Rail Road Company* (1858), p. 14.

> Sensible of the prejudice against large corporations since the failure of the United States Bank [in 1832, some 39 years before], the policy of this company was first directed to the procuring of these connections by securing the organization of independent railway companies, and their construction by such pecuniary assistance as was required to effect this business. This course, it was confidently expected, would meet the objects desired without involving this company in the direct management of distant enterprises.[4]

Nevertheless, in 1869, the eastern trunk lines suddenly changed their long-established policies. The Pennsylvania, the Baltimore & Ohio, and the New York Central all began purchasing connecting lines and then building giant consolidated systems.

Jay Gould's Challenge

The man who forced both this first sudden change in strategy, and then a second one in the early 1880s, was Jay Gould. Gould was still a young man in 1869. Born into a Scottish and Puritan family, raised on a hardscrabble farm in New York State, he was operating a large tannery before he was twenty. In 1859, at the age of 23, he had come to New York to sell leather goods. During the Civil War, he speculated in the securities of small railroads, becoming for a time the chief executive of one. These activities had drawn him to Daniel Drew, a leading Wall Street operator who had seen the speculative possibilities of Erie stock in the late 1850s. In 1867 Gould won national notoriety when he joined with Drew and another infamous Wall Street speculator, Big Jim Fisk, to defeat Commodore Cornelius Vanderbilt's attempt to buy the Erie.

The battle with Vanderbilt came shortly after the Commodore had obtained full control of the New York Central. Vanderbilt, who had made a fortune operating steamboat lines on the Hudson River and Long Island Sound, had decided early in the 1860s to shift his capital and his entrepreneurial energies to railroading. He began by getting control, through carefully timed purchases of stock, of the two lines paralleling the Hudson River from New York City to Albany. He then acquired majority interest in the New York Central, and thus controlled the entire line from New York City to Buffalo, one of the nation's most lucrative transportation routes.

Vanderbilt moved on the Erie because he was certain that any treaty made with its managers would not stick. That road, a developmental line constructed through sparsely settled southern counties of New York, had been financed largely through bonds sold to British investors. Although well managed, thanks to the efforts of its innovative superintendent, Daniel C. McCallum, its lack of traffic brought financial difficulties in the depression of 1857. Drew, who provided funds to meet its immediate needs, joined its board and immediately began to use his inside position to manipulate the price of Erie securities on the New York Stock Exchange. Aware of the competitive threat this weak speculative road posed to the New York Central and Hudson River lines, Vanderbilt decided to take over. But he misjudged the talent of his opponents for financial and legislative chicanery. In a spectacular fight during the first months of 1867, which involved the issuing of millions of dollars worth of fraudulent stock and the wholesale bribing of judges and legislators, Drew, Fisk, and Gould held off Vanderbilt's try for the Erie.

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4. *Twenty-Fourth Annual Report of the Board of Directors of the Pennsylvania Rail Road Company* (1871), p. 17.

As the smoke of battle cleared, Gould emerged as leader of the Erie. The last thing Big Jim Fisk wanted to do was to concern himself with railroad management. Drew resigned, commenting, "There ain't nothing more in the Erie."[5] Gould thought otherwise. By building a system of feeder lines into the Erie, he could raise the value of its stock. In fact, the road might even become a paying proposition if a large flow of traffic were diverted to it. This Gould proposed to do by obtaining control of roads that provided it with connections to the West. He quickly leased the Atlantic and Great Western from its British backers, who had become financially distressed.

Gould next embarked on a campaign to get control of the western allies of the Pennsylvania Railroad. Late in 1868, he began negotiating for the Indiana Central, which connected the Atlantic and Great Western with St. Louis. Thomas A. Scott, the Pennsylvania's executive in charge of external affairs, effectively parried Gould's try for the Indiana Central but only by offering a higher price for it. Gould's attempt to get the Cleveland and Pittsburgh and the Pittsburgh, Fort Wayne and Chicago (the Pennsylvania's key connections to Cleveland and Chicago), was more novel. He did so by buying up proxies to be voted at the road's annual meeting. Scott prevented Gould from controlling the meeting by challenging the legality of the proxies in the Ohio courts. He turned aside the threat to the Fort Wayne by having its charter altered by the Pennsylvania legislature so that only one-quarter of the directors could be appointed at each annual meeting. The legislature was sympathetic because its members realized that Gould's control of the Fort Wayne would divert much of the traffic of the West from Philadelphia to New York City.

Yet Gould's swift and unexpected attack forced the Pennsylvania to adopt a new competitive strategy. "In view of these extraordinary movements, it became evident to your board," Thomson reported to the stockholders, "that this company must depart from the policy that had heretofore governed it, and obtain direct control of its western connections." By July 1, 1869, the Pennsylvania had leased the Fort Wayne and the Cleveland and Pittsburgh on reasonable terms. Their directors far preferred Thomson and Scott as associates to Jay Gould.

Blocked by the Pennsylvania, the Erie's president immediately turned his attention to the lines running along the southern shores of Lake Erie. Early in April he renewed an agreement with the Michigan Southern to obtain access to Chicago. By summer Gould had arranged to merge that line with others along the shore of Lake Erie between Toledo, Ohio and Erie, Pennsylvania, to form the Lake Shore and Michigan Southern. At the same time, Gould began to buy stock in the Toledo, Wabash and Western, a through road connecting Toledo to St. Louis. In August, he was elected to its board. Vanderbilt, who had been echoing the views of the Pennsylvania's executives by saying he had no interest in controlling or managing lines to the West, now suddenly realized he was about to lose these vital western connections to Jay Gould. It was only Gould's other speculations which permitted Vanderbilt to save the situation by reversing his earlier policies and obtaining control of the Lake Shore. In October 1869, Gould had joined Jim Fisk in their most daring speculative coup, an attempt to corner the gold market. In the stock market shakeup that followed the failure of the corner, Gould ran into a liquidity crisis; and Vanderbilt, awash in funds, got control of the Lake Shore. Vanderbilt also picked up blocks of Wabash stock and soon had his representatives on its board, including his son-in-law Horace F. Clark.

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5. Quoted in Matthew Josephson, *The Robber Barons* (New York, 1934), p. 194.

Responses to Gould's Challenge

For all his energy and unscrupulousness, Gould had lost this first campaign for western outlets. But he did force the other trunk lines to obtain full control of western connections and caused two of them to alter their basic strategies of growth. Senior executives of the Pennsylvania immediately began, in the words of a stockholders' committee, "with grand ideas, [to] form a plan or policy to reach all important points in the West with their lines."[6] In the 1870s, the Baltimore & Ohio and, to a more limited extent, the Erie, followed the Pennsylvania's example. And later, in the 1880s, Vanderbilt and railroad executives in all parts of the country began to adopt a similar strategy.

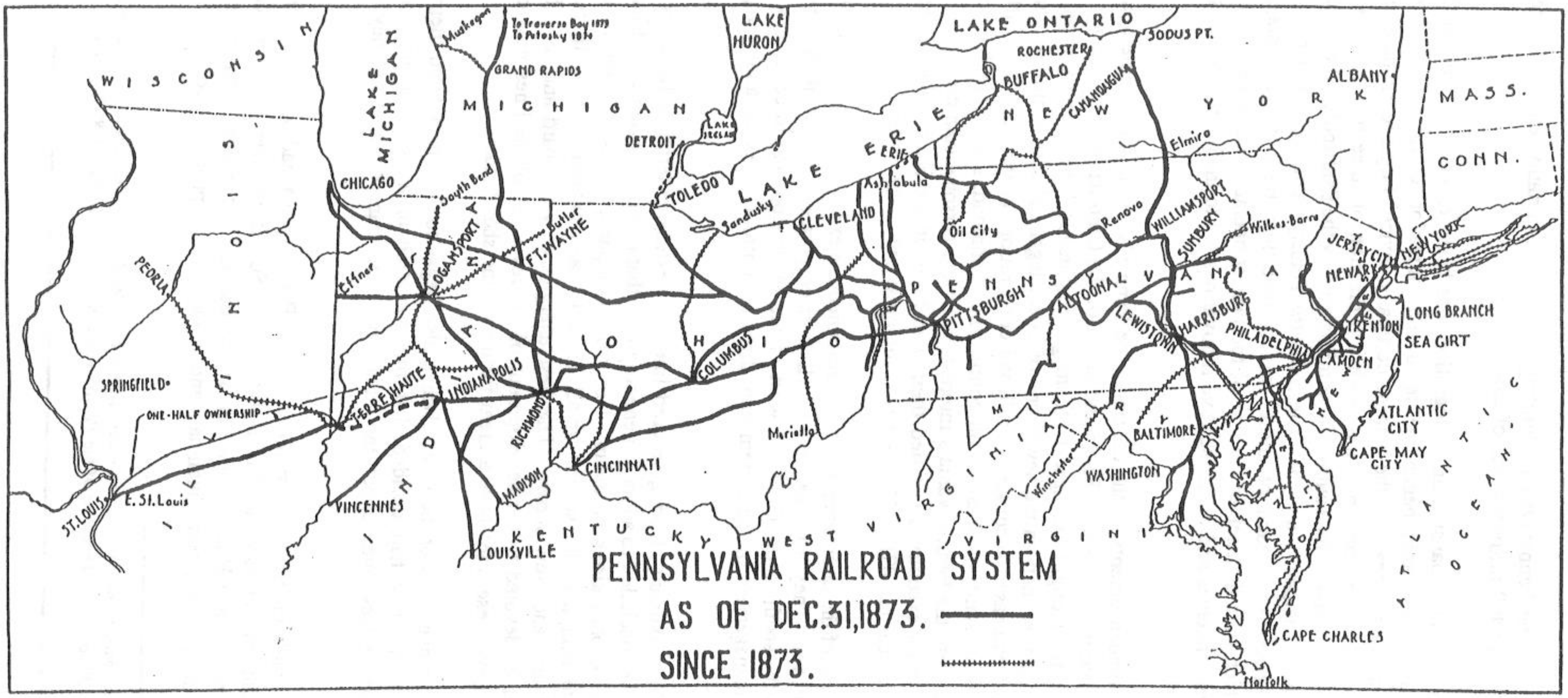
In 1869 the Pennsylvania began through lease or purchase to build a vast, integrated network of lines joining the major cities of the Midwest to the Atlantic seaboard. It leased or bought control of the major roads connecting Columbus, Cincinnati, Indianapolis, Louisville, Maysville (Kentucky), Cairo (Illinois), and St. Louis. Simultaneously, the Pennsylvania purchased control of lines to the lake ports and the lumber region of Michigan. Then in 1871 it leased for 999 years the "Joint Companies" in New Jersey in order to insure absolute control of the routes from Philadelphia and other Pennsylvania rail centers into New York City.[7]

In less than five years, the Pennsylvania grew from a line of 491 miles of track to one of just under 6,000 miles. Its capitalization stood at almost $400 million, about 13 percent of the total capital invested in all American railroads. By 1874 its system was much the same as it would be for the next ninety years. The mileage it directly administered equalled that of the railroad network of Prussia. Only two nations in the world, Great Britain and France, had more miles of railroad than did the Pennsylvania system. (See map.)

In creating a self-contained system, the Pennsylvania carried its strategic planning beyond railroad construction. In 1871 it organized the American Steamship Company to run from Philadelphia to Liverpool as a way of lessening its obvious dependence on its New York City outlet. Then it invested in the International Navigation Company, which ran ships to Antwerp and other continental ports. In the following year, it completed arrangements to purchase control of a major fast freight line, the Union Railroad and Transportation Company. It also purchased stock in a second such line, the Empire Transportation Company. During the same period, the Pennsylvania even entered mining and manufacturing. In 1872 and 1873 it bought large coal properties in the state's anthracite region. Shortly thereafter, the road helped to finance the Pennsylvania Steel Works Company to assure itself of a steady supply of steel rails produced by the recently invented Bessemer process. Finally, to encourage the cooperation of the supplier of the nation's sleeping and parlor cars, it made a small investment in the Pullman Palace Car

6. *Report of the Investigating Committee of the Pennsylvania Rail Road . . . by Resolution. . . .* March 10, 1874, p. 45.
7. These developments can be followed in the annual reports of the Pennsylvania for the years 1870 to 1874.

Map of the Pennsylvania Railroad System



Source: George H. Burgess and Miles C. Kennedy, *A Centennial History of the Pennsylvania Railroad, 1846-1946* (Philadelphia, 1949), pp. 318-319.

Company. Even so, the Pennsylvania's holdings in nontransportation enterprises remained only a small part of its total $400 million worth of assets.

As the strategy of expansion and integration was being executed, Thomson, Scott, and their associates on the Pennsylvania began the legal reorganization of their many properties into a consolidated enterprise by means of the holding company device. Legal reorganization was followed by thorough administrative reorganization, with the creation of three major operating units, each headed by a general manager: the southwest (administered by the Panhandle), the northwest (operated by the Pennsylvania Company), and the eastern (by the Pennsylvania Railroad Company). Managed by general superintendents, each of these was divided into three or four major geographical subdivisions, which were themselves the size of the largest operating railroads in the country during the 1870s. These strategies and administrative innovations led to the biggest business enterprise the world had yet seen.

Despite pronouncements to the contrary, the Pennsylvania in these same years looked to its connections beyond the Mississippi River and south of the Ohio River. But outside of "the country which your company thought belonged to them geographically," the executives relied more on the older policy of alliances than on the newer one of direct legal and administrative control.[8] By 1873, the company had purchased securities of railroad corporations connecting Cairo, Illinois with New Orleans and in roads south of Washington connecting Richmond, Danville, Charlotte, Raleigh, and Atlanta. To the west, the Pennsylvania's interest was more personal than corporate. Tom Scott and probably other senior executives invested their own funds in the Kansas Pacific and in the Union Pacific, and for a year in 1871-1872, Scott was the president of the latter.

The coming of the depression of 1873 dampened the expansive mood of the Pennsylvania and its senior executives. They now decided to sell their corporate and most of their personal interests in the roads to the south of the Ohio and west of the Mississippi and to concentrate instead on the more efficient management of the system they directly controlled. As the annual report for the year 1874 announced:

> Your company, having secured lines and extensive terminal facilities . . . your board have concluded to adopt as general policy that no further extension of lines should be made or obligations be assumed by your company, either by lease or otherwise, except to complete the several small branches and extensions now in progress in Pennsylvania and New Jersey. The best energies of your board and its officers will hereafter be devoted to the development of the resources of the lines now controlled. They believe these lines have a great future for the shareholders.[9]

The directors and managers of the Pennsylvania also began to draw back from their steamship, coal, and steel ventures. They had decided that the operation of a self-contained railroad network connecting east to west was about the maximum size transport system they could profitably administer.

Gould's raids on the western allies of the Pennsylvania had an immediate impact on the Baltimore & Ohio as well as on the Pennsylvania. In 1869, its president, John W. Garrett, purchased control of a line to Lake Erie and another to Pittsburgh. In the same year the road increased its ownership in the Marietta and Cincinnati and made its vice president, John King, the Marietta's

8. *Report of Investigating Committee of the Pennsylvania Rail Road . . . by Resolution. . . . March 10, 1874*, p.75.
9. *Twenty-eighth Report of the Directors of the Pennsylvania Rail Road Company* (1875), p. 43.

president. Finally, in 1874, Garrett decided he needed his own connection into Chicago and so ordered the construction of 263 miles of new line from the Sandusky road directly to Chicago.

The Baltimore & Ohio also moved, as had the Pennsylvania, into nonrailroad enterprises. It purchased coal properties and built a steel rolling mill. After an unsuccessful venture with a steamship line to continental ports, President Garrett turned to an alliance with the powerful North German Lloyd Steamship Company to provide shipping to Britain and the Continent. While the Baltimore & Ohio did not support a large express company, it did develop a chain of hotels along its lines. Moreover, Garrett insisted on building sleeping and parlor cars, even at the cost of a lengthy patent dispute with Pullman and others. As the road's historian has emphasized, Garrett "very much preferred to run the company in every way as a self-contained and highly independent unit."[10]

The Erie, bled white by Gould in the early 1870s, was financially too weak to carry out a really effective policy of expansion. In 1874, however, it again leased the Atlantic and Great Western, which Gould had sold off at the time of his departure. That road had already obtained a tight but not complete control of the Bee Line from Cleveland to Indianapolis. Bankruptcy during the depression postponed its obtaining its own line to Chicago until 1880. Then it did so by building a road 250 miles from the Atlantic and Great Western to Hammond, Indiana on the outskirts of Chicago. This achievement was somewhat soured by the Erie's loss of the Bee Line to Vanderbilt in the following year.

The Vanderbilts had waited for more than a decade after Gould's raid on the Lake Shore before beginning to plan a strategy for building a self-contained, integrated railroad system. After the unexpected death of his son-in-law and representative, Horace Clark, in 1873, the old Commodore sold the family holdings in the Wabash and other midwestern roads in which Clark had purchased stock, turned over the management of the Lake Shore to a professional manager, John H. Devereux, and made it clear that he had no intention of enlarging his railroad properties. William Vanderbilt, who took charge of the family interests when his father died in January 1877, was even more cautious and conservative.

The Vanderbilts' railroad enterprises were the only major ones in the United States based on the fortune of a single family. They could only expand their railroad activities by raising large amounts of money or by exchanging the stock of the New York Central for that of other roads. Either move would dilute their control. Moreover, expansion would require a large increase in the number of professionals in the roads' management and would lessen family control over operating decisions. One historian who studied the strategy of railroad expansion with great thoroughness has suggested the price William Vanderbilt paid for this cautious approach:

> He rarely took the initiative to seize the vantage point from which he could dictate the detailed negotiations; he was almost always on the defensive. In such a position repeated attacks by his opponents forced him into a negative strategy. He was unable to develop mature and well-conceived plans to overcome his opponents so as to make them, and not himself, sue for terms of peace. And when the opposition persisted in its aggressiveness, he frequently sued for peace. He thereby became one of the country's

10. Edward Hungerford, *The Story of the Baltimore & Ohio Railroad Company*, Vol. II (New York, 1927), p. 126. Hungerford's second volume on the Baltimore & Ohio has been used to supplement Grodinsky's *Gould*. Hungerford's *Men of Erie* (New York, 1946) provided additional information on that road.

> greatest business appeasers. In one contest after another, Vanderbilt made the concessions necessary to the termination of a business war.[11]

Vanderbilt was not quite as weak and passive as this historian makes him out to be. His alternative to expensive consolidation was an eminently reasonable one. It was to join with his competitors in a cartel to set and maintain rates.

In fact, during the 1870s, nearly all railroad financiers and managers believed that the formation of regional federations or associations was the best way to keep traffic coming over their tracks at much less cost than building a large consolidated enterprise in the manner of the Pennsylvania. Yet, these executives remained all too aware of the constant temptation to cheat on their cartel partners—to cut below posted rates. The temptation was irresistible to the weaker roads, which needed income to pay interest on their funded debt so that they could stave off bankruptcy. The more the volume of traffic fell, the more necessary it became to put unused equipment and men back to work by rebating or otherwise cutting rates. A rate that little more than covered the out-of-pocket costs was better than one that produced no traffic or income at all. The only way the strong competing roads could meet such price cuts was to make similar ones. Moreover, by going into bankruptcy, a road no longer had to meet interest charges. Its lower fixed costs meant that it could continue to charge lower rates than its competitors. Most railroad managers came to believe that the logic of railroad competition was bankruptcy for everyone.

Therefore, they opposed unrestricted competition. The answer to the problem, they maintained, was a formal association or cartel which pooled through traffic or profits, allocating one or the other according to prearranged percentages. The first such association was formed in 1875 in the South, when Albert Fink, the president of the Louisville and Nashville, proposed the setting up of such a cartel and then himself became its head. Two years later, after a particularly extended and exhausting rate war, the presidents of the great east-west trunk lines asked Fink to come north to organize and manage a similar organization in their area. The initial success of both the Eastern Trunk Line Association and the Southern Railway and Steamship Association quickly led to the formation of several comparable regional ones in other parts of the nation.

All these groups had much the same organization. At annual conventions the traffic managers and presidents of the roads working with association officials reviewed and revised the rates and percentages of traffic or profits allocated to each line. The association's executive body then became responsible for seeing that allocations were made and rates maintained. In addition, a Board of Arbitration was formed to listen to the complaints concerning administrative action and settle controversies between the roads. (Fink's description of his organization, given in testimony before Congress, is reproduced as Appendix A.)

Here and elsewhere Fink stressed, and railroad financiers and managers agreed, that such formal federations were the only way to prevent "centralization and absorption of roads under the absolute control of one or a few persons. It makes a separate individual existence of these roads possible, and puts a check on the consolidation of these roads.... It secures all the advantages of consolidation without its disadvantages." Fink urged the members of the association and their roads to make concerted efforts to have "the operations of this committee legally binding upon all parties by legislative action, provided that it could be shown, as I believe it can, that its operation is beneficial to the public interests." Yet despite an active campaign before congressional committees, Fink and

11. Grodinsky, *Gould*, p. 209.

many other railroad managers who supported the proposal failed to get the national legislature to sanction their private federations. And they soon found, to their sorrow, that they could not rely on the intelligence and good faith of railroad executives, particularly speculators such as Jay Gould.

Gould rarely let the Eastern Trunk Line and other associations interfere with his attacks on the traffic and the stocks of other roads. In 1878, the year after the formation of the Trunk Line Association, Gould's aggressive challenges caused Vanderbilt to obtain a majority of the stock of the Michigan Central. To protect this investment, Vanderbilt purchased control of the Canadian Southern, which connected the New York Central with the Michigan Central. These expenditures helped to convince Vanderbilt of the futility of trying to maintain family control. So, in 1879, he arranged for a rising investment banker, J. Pierpont Morgan, to sell off a portion of his New York Central stock.

Finally in 1881 Gould goaded Vanderbilt into taking the offensive. In that year Gould created, for reasons to be considered shortly, an impressive looking railroad system reaching from the Rockies to the Atlantic coast. Then, by sharply cutting rates, he reduced Fink's Eastern Trunk Line Association to shambles. Now convinced that formal federations or associations could not keep the peace, William Vanderbilt decided that he too must have a self-contained system that reached all the important commercial centers of the Northeast and the Old Northwest. He moved secretly to obtain control of the Bee Line, hitherto an Erie connection from Cleveland to Indianapolis. The Bee Line only controlled 50 percent of the road from Indianapolis to St. Louis, so he persuaded the Pennsylvania to sell him the remaining 50 percent. Then to forestall the effects of Gould's drive east through the anthracite region, Vanderbilt secured a large, though not controlling, amount of stock in the Reading and built a costly connection between that road and the New York Central.

In 1882 Vanderbilt made two more moves which, while part of his current offensive, were still instigated by the actions of competitors. First he purchased the New York, Chicago and St. Louis, a new road which had just opened, paralleling the Lake Shore from Buffalo to Chicago. Its promoters had built the road, which went by the name of Nickel Plate, for the sole purpose of selling out, at a profit, to either Vanderbilt or Gould. Again Vanderbilt felt forced to buy before Gould did in order to maintain railroad peace.

System Building in the West

The great railroad systems in the west grew in much the same ways and for much the same reasons as did those in the east. The better-located, better-financed, and better-managed roads usually worked for peace through alliances with both connecting and competing roads. Those less advantageously situated and less substantially financed found difficulty in maintaining agreements and in obtaining loyal allies among connecting roads. The latter tended to attract speculators who then both cut rates and began to buy or build connecting roads. The stronger roads responded first by abandoning their reliance on informal and then formal alliances or cartels and then by obtaining legal and administrative control of lines to major commercial centers in their areas. In the west as in the east, Jay Gould did more than any other individual to stimulate the creation of gigantic railroad enterprises.

In the west, the strategy of expansion involved more construction of new roads and less purchasing of existing ones. Since the western roads relied more on outside capital than did those of the east, strategies of construction and competition were often decided by persons living far away. Many times Wall Street and State Street had the final say as to the direction of growth and ultimate

economic destiny of the regions they served. In addition, construction in the west benefitted from government subsidies in the form of land grants.

Until Jay Gould embarked on his imperial plans in the west at the end of the 1870s, the roads running northwest, southwest and west of Chicago continued to rely on a policy of alliances. The most effective of these was the Iowa Pool, formed in 1870 by the Burlington, the Rock Island, and the Chicago and Northwestern. By 1879, these and others had been replaced by formal cartels based on Fink's Eastern Trunk Line Association. Such agreements had the strong support of major investors who sat on the boards of these roads, such as John Murray Forbes of the Burlington, William Osborne of the Illinois Central, and David Dows and Peter Geddes of the Northwestern.

On the other hand, a few of the younger professional managers, particularly Charles Perkins of the Burlington, spoke out against the conservative policies of their boards. Perkins maintained that the then current economic depression provided an opportunity to build their "defenses" by obtaining lines into key cities at low prices. In 1878, in a number of detailed reports, Perkins outlined an explicit strategy. He urged that the Burlington take over its ally in Nebraska, the Burlington and Missouri, and purchase adjoining roads, some of which were still unfinished, to assure it of its own entrance into Kansas City and St. Joseph. "If we do take them now, when they are bankrupt," Perkins wrote Forbes, "and before others awake to the value of that region, we control that country and can extend the roads at our leisure."[12]

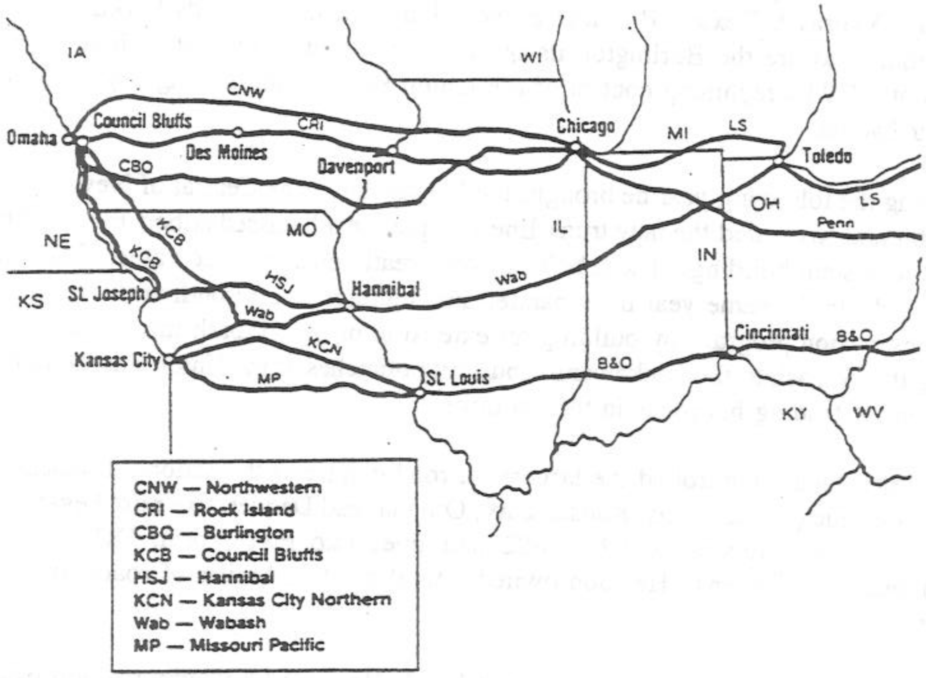
Perkins further wanted to gain control of the Hannibal and St. Joseph and so complete an integrated railroad system. As he told Peter Geddes:

> I have long been of the opinion that sooner or later the railroads of the country would group themselves into systems and that each system would be self-sustaining or, in other words, that any system not self-sustaining would cease to exist and be absorbed by those near at hand and strong enough to live alone. . . . Each line must be its own feeders.[13]

But Forbes, Geddes, and other directors still believed as they had all through the 1870s that such a consolidated system would become "too large for management." (See map.)

12. Grodinsky, *Gould*, p. 229. Richard C. Overton, *Burlington Route* (New York, 1965), pp. 166-170. Thomas C. Cochran, *Railroad Leaders* (Cambridge, 1953), p. 307.
13. Quoted in Cochran, *Railroad Leaders*, p. 433.

Western Railroads, 1881



The Iowa Pool roads and the other lines between the Mississippi and Missouri Rivers that became pawns in Gould's blitzkrieg.

Source: Klein, *The Life and Legend of Jay Gould*, p. 234.

And then came Jay Gould. Gould had moved into western railroading by purchasing control of the Union Pacific, the road that with the Central Pacific formed the first transcontinental railroad. Early in the depression of the 1870s, the Union Pacific road was in poor financial condition, and its stock was selling at a very low price. Sniffing a good speculation, Gould began to buy, and by the spring of 1875 he had control. At first, Gould concentrated on reorganizing the Union Pacific's finances and management. During this time he became increasingly dissatisfied with the three roads of the Iowa Pool that carried his traffic eastward. His first response was to purchase stock in two of these three roads, the Northwestern and the Rock Island. Once on their boards, he attempted in March 1877 to work out with them and the Burlington an agreement which included joint ownership of the Burlington and Missouri—a
proposal that the Burlington's president rejected. Unable to assure himself of eastern connections, Gould then turned as he had done earlier in the East to building a system of his own.

Moving swiftly and relying on his expert skill as a stock market trader, Gould soon put together a system that was for a short moment even more extensive than the Pennsylvania. To obtain a war chest, he sold his Union Pacific stock in a speculative coup in February 1879. He then acquired control of the Kansas Pacific connecting Denver and Kansas City, and the Denver Pacific connecting Denver with the Union Pacific. Then, in April, 1879, he secretly bought large blocks of stock of the Wabash, running from St. Louis and Hannibal, Missouri to the Great Lakes. Because the Wabash was

just out of receivership and because it relied on the more powerful trunk lines for its traffic, its stock was selling at a depressed price. Gould therefore captured it at little cost. He next moved to obtain control of roads joining Kansas City to St. Louis. Then he outmaneuvered Perkins to get control of the Missouri, Kansas & Texas. By these moves Gould carried off roads Perkins earlier had insisted were essential to assure the Burlington its outlets to the south and west. Finally, Gould closed his campaigns of 1879 by regaining control of the Union Pacific and merging it with the Kansas Pacific and Denver Pacific.

During the following year he brought the Lackawanna, the Central of New Jersey, and the Erie into his orbit and so created the new trunk line complex that harassed Albert Fink and turned William Vanderbilt to system-building. These bold moves greatly enhanced the value of the securities Gould had purchased. In the same year he expanded his holdings in the southwest. He also embarked on a broad construction program by building an extension of the Wabash into Chicago, building a line connecting the Wabash to the Lackawanna, building branches of the Union Pacific into Wyoming and Montana, and extending his roads in the southwest.

By 1881, Gould controlled the largest railroad empire in the nation. It reached Boston, New York, Toledo, Chicago, St. Louis, Kansas City, Omaha, and Denver. He next began a quest for more connections to the southwest and by 1882 had lines into Fort Worth, Dallas, El Paso, Laredo, Galveston, and New Orleans. He soon owned a total of 15,854 miles of roads, or 15 percent of the nation's mileage.[14]

But his control proved tenuous and short-lived. He made no attempt to coordinate or efficiently administer the activities of his various properties. Some of his roads actually did not connect with the others, so shipments of through-freight were hampered. Nor did his system, particularly in the east, run over the most favorable transportation routes. So the Gould empire fell as quickly as it arose. By 1882 he had pulled out of the Union Pacific, using the proceeds to build up the newly acquired network south and west of St. Louis. By 1884 he had disposed of most of his eastern lines. From the mid-1880s on, Gould concentrated on building a regional system in the southwest.

Short-lived as his empire was, it had a lasting impact on American railroad history. His rapid purchases, his moves into the territories of other lines, his delight in breaking agreements on rates or allocation of traffic forced the directors of western railroads, as well as William Vanderbilt, to create what Perkins had termed "self-sustained" systems. Informal alliances such as the Iowa Pool became completely ineffective. Nor did the more formal associations which had grown up in imitation of Fink's trunk-line association prove much more successful. Soon nearly all western railroad men agreed that they must legally control their own lines into the major commercial centers of the regions they served.

On the Burlington and a little later on the Rock Island, the earlier exponents of expansion, Perkins and Cable, became presidents of their roads. Perkins, who wrote Forbes that "Gould moves so rapidly, it is impossible to keep up with him with Boards of Directors," was given a relatively free hand.[15] He merged the Burlington and Missouri in Nebraska for the parent line; he purchased control of an essential if indirect connection with Council Bluffs and Kansas City at a cost that must have shocked many a Boston stockholder. In 1882, in retaliation for the Wabash's move into Iowa, Perkins built his own line to Denver. In the next year he regained full control of the Hannibal and St. Joseph and during this time continued to build into Wyoming, Montana, Colorado, and Nebraska.

14. Grodinsky, *Gould*, p. 354.
15. Cochran, *Railroad Leaders*, pp. 136-137.

Finally, in 1885 he financed and had built a road into St. Paul. The Burlington, which operated just over 600 miles in 1870 and was administering 2,772 miles by early 1881, operated close to 5,000 miles by 1887.[16]

In the same first half of the 1880s, the Chicago and Northwestern embarked on a comparable policy of expansion. That road had the benefit of Vanderbilt financial support, for the New Yorker, anxious to counter Gould, had decided to have Northwestern as his primary connecting ally west of Chicago. Between 1880 and 1884 its purchases and new construction expanded its mileage from under 1,000 to close to 5,000 in the agricultural region northwest of Chicago. The St. Paul followed the same strategy. It responded to Perkins's decisions to build into St. Paul by constructing its own line through Burlington territory to Kansas City. Even before that extension was completed, it had reached the 5,000-mile mark. By the mid-1880s, "Each road suddenly realized that a policy of aggressive invasion was the only safe defense."[17] In this short stretch of years, similar strategies led to the formation of similar systems in the sparsely settled Far West, the more populous areas of the South and urban New England. Everywhere, railroad executives gave up their faith in informal alliances, lost hope in the effectiveness of more formal federations, and turned to building their own "self-sustained" systems.

This competitive buying and building during the 1880s led to a large number of financial failures in the 1890s. During the 1880s, 75,000 miles of road were built in the United States, by far the greatest amount of mileage ever built in any decade in any part of the world. Yet, by the early 1890s, a quarter to a third of all railroad mileage of the United States was in bankruptcy. After the financial and administrative reorganizations of the 1890s, carried out by J.P. Morgan and two or three other leading investment banking houses, some 25 great systems came to operate most of the railroad mileage in this country. At the turn of the century these systems secured still greater stability by purchasing large blocks of stock in neighboring ones and so developed what was called a "community of interest" in each major region. By the early twentieth century, eight to ten groups controlled the American overland transportation network.

16. These mileage figures for the Burlington, the Chicago and Northwestern and the St. Paul are from *Poor's Manual of the Railroads of the United States* for 1871-1872, 1888, and 1891.
17. Grodinsky, *Gould*, p. 526.

Appendix A

Jay Gould and the Coming of Railroad Consolidation

Albert Fink, "The Railroad Problem and Its Solution." *Testimony before the Committee on Commerce of the United States House of Representatives January 14, 15, and 16, 1880* (Washington, D.C., 1880), pp. 18-24.

The railroad companies have endeavored to secure unity of action by voluntary cooperation in all matters in which it is absolutely necessary for the proper management of the roads, in the interest of the public, as well as in the interests of the proprietors of the roads. But this cooperation has been most inefficient in all matters relating to the uniformity, equality and permanency of railroad tariffs [rates], although in other respects, as already mentioned, it has been very successful. . . .

The managers of roads meet in convention, and make agreements which are broken before they disperse. Everyone who has paid the least attention to this subject is familiar with these unsuccessful efforts. The press of the country chronicles almost daily some conference held by officers of railroad companies, or some agreement made, and on the following day it chronicles its violation or discontinuance.

During the last few years, however, some progress has been made toward a closer and more effective cooperation. Associations of railroad companies have been formed, with a proper organization, through which it was made at least possible to control the important tariff question. The first complete organization of this kind, and to which I shall refer hereafter more particularly, and explain fully its object and its methods, was the Southern Railway and Steamship Association, formed in October 1875, and which is still in effective operation.

In 1877 the four Trunk Lines—the New York Central, Erie, Pennsylvania, and Baltimore and Ohio Railroads—entered into a similar compact, by which all the Westbound traffic from the seaboard was managed under one organization. . . . I do not mean to say that perfection has been reached in this respect, because much remains to be done; but cases of violation of the tariff rates, as far as the Trunk Lines can exercise their influence, are now the exception, and not, as heretofore, the rule.

Similar efforts at closer and more effective cooperation have been made by the railroads west of Chicago and St. Louis, which have been in a great measure successful.

During the last year the principal roads embraced in the territory east of the Mississippi and the Atlantic seaboard, including the Trunk roads, and the Grand Trunk, have formed an organization known under the name of the Joint Executive Committee, for the purpose of securing uniform and equitable rates on the whole of their Eastbound traffic. This organization is of the same character as that of the Southern Railway and Steamship Association. . . . Acting as chairman of that committee, I beg leave to read an extract of the report which I was able to make at its first annual meeting in Chicago, in December last.

> You have now for the first time established a practical method by which the competitive traffic of your roads can be properly managed and controlled. Heretofore this was impossible; the mere holding of conventions of railroad managers, passing resolutions, and then dispersing and letting things take care of themselves, each party

> acting as it sees fit, will not accomplish the purpose of intelligent joint management of the large property under your charge. You have now added to the legislative department—your conventions—also a permanent executive department, the duty of which is to see that the resolutions passed and agreements made are faithfully carried out. In addition to this you have also established a judiciary department, consisting of a board of arbitration, whose duty it is to settle peaceably any question of difference, without resort to wasteful warfare, with all its injurious consequences. You have thus formed a complete government over this large competitive traffic over which it has heretofore been found impracticable to exercise intelligent control. . . .
>
> The companies composing this association have already, by their voluntary action, abolished the pernicious system of special contracts, and all shippers are now put upon an equal footing. Rates for the last few months have been everywhere (in the territory in which these roads are located) maintained, and the great disparity between the local rates and the competitive through rates, which has heretofore been so great a source of trouble and complaint, has ceased to exist. Had such a result been sooner reached, we would have heard nothing of legislative control of railroads.
>
> I express it as my opinion, the result of the most careful consideration, that the only legislation required to accomplish the object which the most zealous advocate of the public interests can desire to accomplish, is to legalize, and even to enforce, the cooperative system of the railroad companies. . . . The committee, during its existence, has established rates lower than they have ever existed before, and even the highest rates charged have not exceeded those of the last few years, but have been considerably lower, although the conditions for high rates have been more favorable this year than they have been for years past.

From this, it will appear that, in my judgment, the only measure now wanted in order to give permanency to the operations of these associations, is to recognize the same as necessary and beneficial, to give legal force to the voluntary agreements that may be made between its members, with the view of carrying out the objects of the association, namely, the establishment and maintenance of reasonable and nondiscriminating transportation tariffs; in fact, the object of your proposed legislation. If Congress would pass a law to this effect, I would consider the whole railroad problem in this country settled, and settled upon truly American principles. . . .

I regret that I have not sufficient time to point out at length the great merits and advantages of this American plan of governing the railroads as compared with the European plans, to which I have referred. It accomplishes fully the object contemplated by the centralized government of the railroads in Germany. It brings unity in the management of the roads, as far as that is desirable or necessary; and at the same time, it preserves the individuality of each road, and reserves to it the management of all its local affairs, in which it and the country through which it passes is alone concerned. Cooperation of the roads is only required in so far as the interest of the whole system of roads and the public interest requires it—no further. In this respect, the government of the railroads would be based on the same principle that underlies the government of the United States—the general government taking cognizance only of matters in which the several States are jointly interested, leaving to each individual State—and, in this case each road—to manage its own local affairs as it thinks best, in accordance with the laws of the State which created it. . . .

The plan which I propose prevents that very centralization and absorption of the roads under the absolute control of one or few persons. It makes the separate, individual existence of these roads possible, and puts a check upon the consolidation of roads, which is regarded with so much alarm by the people in this country, but which is the natural result of the struggles of the railroad companies: the stronger must at last absorb the weaker. The proposed government of the road secures all the advantages of consolidation, without its disadvantages. Instead of conferring upon and concentrating great power in the hands of a few, it has the contrary effect—it will leave that power distributed among a great many separate corporations.

Peter Tufano, "Business Failure, Redefinition of Claims, and Financial Innovations: A Nineteenth Century Case Study"

I. Introduction

This paper examines the numerous financial innovations that were popularized by U.S. railroads emerging from financial distress in the late nineteenth century, including preferred stocks, income bonds, deferred interest bonds, and voting trusts. The timing and form of these innovations suggests that they were responses to a set of related stimuli: the financial failure of early capital-intensive modern corporations which in turn led to the extensive redefinition of claims arising from the courts' development of a process to restructure distressed firms. Thus, the paper not only documents a period of active financial innovation which has received little recent academic attention, but also proposes to explain this innovative activity as a market response to changes in the legal and political environment.

In brief, I show that during the late nineteenth century, the railroad industry was plagued by financial distress. To resolve claims arising from the defaulted railroads in the absence of legislation governing the bankruptcy process, federal courts responded by creating a system of reorganization rules which constituted the process of equity receivership. The new rules embodied in equity receivership solved the interim problems of the railroads, but at the cost of fundamentally altering terms of existing financial contracts, thus providing investors with new valuable information. The innovative contracts popularized to refinance the distressed railroads can be interpreted as direct responses to this new information, and specifically the contracts can be seen as attempts to increase monitoring and control of management and at the same time to reduce the likelihood of renewed court intervention.

While it is always difficult to explain why a particular security flourished, the nineteenth century setting of this case study makes it clear which forces can not explain the type or timing of the innovations studied here. Federal income taxes were not levied until 1913, the first state security

regulations ("Blue Sky Laws") were not passed until 1911, federal regulatory mechanisms of the SEC were not set up until the 1930s, and the Interstate Commerce Commission, while in place since 1878, imposed few restrictions on the security issuance or bankruptcy processes. Thus, explanations must look beyond forces like taxes and regulation which spur innovation today [See Miller (1986)].

The remainder of this paper is divided into four sections. Part 2 motivates the case study by discussing how the revelation of new information, particularly information on how well contractual rights and obligations are enforced, can stimulate recontracting and financial innovation. Part 3 describes the new information nineteenth century investors received about contract rights as they observed the development of the legal process of equity receivership that was used to reorganize failed railroads. Part 4 documents the financial innovations popularized by railroads emerging from distress in the late nineteenth century, arguing that the timing and form of these innovations demonstrates the market's attempts not only to monitor and control managers more closely, but also to reduce the need for court intervention which might compromise their property rights. Part 5 concludes with a discussion of the implications of these findings.

2. Hypothetical contracting responses to distress and the redefinition of claims

Many models of contracting demonstrate that new contracts arise in response to the revelation of new information.[1] For example, Aghion and Bolton (1988) model how parties choose to restructure security contracts after firm value is revealed to be low. Their approach explicitly recognizes the incomplete nature of security agreements; after the contract is signed, material events occur that cannot be specified ex-ante. In Aghion and Bolton's model, distress reveals *firm-specific* information, which may indicate the soundness of the firm's strategy, the effectiveness or honesty of

[1] For an overview of financial contracting models, see Harris and Raviv (1990).

its managers, or changes in the competitive environment. In response to firm-specific information, .. lenders may demand higher promised returns or tight covenants to warn of renewed troubles. Capital suppliers may seek closer supervision over management [eg., see Gilson (1990)]. It seems quite likely that distress, by itself, may encourage recontracting to more carefully monitor and control management.

A firm's distress may instruct investors not only about the firm, but also about the efficacy of previously written contracts. Many contractual provisions -- including seniority, security interests, and preferences -- take on practical meaning only in distress. For instance, only in default can a secured lender exercise its rights as a lienholder. When distress occurs, investors attempt to exercise their contractual rights and learn whether the contracts work as designed.

Poorly written contracts may fail because they contain loopholes that permit investors' interests to be exploited. Managers' incentives to bend --if not break-- poorly constructed rules may be greater in difficult financial times, and the process of financial distress may merely provide public disclosure of the breach. Once disclosed, loopholes can be closed by new contracts. For example, event risk covenants are recent additions to bond indentures reflecting investors' recognition of the risks of previously uncontemplated changes in corporate control and financing [Lehn and Poulson (1991)].

Even well drafted contracts may fail. Securities, as legal agreements, are enforced in court. Judges must adjudicate conflicts among claimants -- both explicit claimants and implicit claimants ("the public interest.") If, in the course of deciding a particular case, courts substantially alter or redefine the terms of existing contracts, new information is revealed not only to the parties at the bar, but also to investors in general. This new information about the contracting process will motivate the search for new contracts, just as surely as the firm-specific information embodied in models like Aghion and Bolton's, although the type of contracts may differ from those adopted in reaction to the revelation of firm specific information.

If courts fail to enforce previously written agreements or they redefine their terms, investors may be skeptical of their ability to create contracts that can withstand subsequent judicial redefinition. If so, investors may seek to create contracts whose property rights are primarily protected <u>outside the courts</u>. By creating contracts that do not require court enforcement, the uncertainty of contract redefinition imposed by the legal process can be reduced, although these contracts may be second-best to ones which could rely on a stable set of legal rules. The notion of designing contracts that circumvent the legal system is central to Merton's (1991) plan for no-fault default. Merton proposes that firms issue a set of securities whose payoffs are isomorphic to those which debt holders would receive under absolute priority rules. Rational bondholders will exercise their rights prior to distress, and thus Merton's scheme would allow a firm to be restructured without passing through the arguably costly bankruptcy process. We might expect that when investors learn of the inherent short-comings of judicially enforced contracts, they too might opt for methods of protecting their rights that do not require enforcement through the legal system.

In summary, we might expect that when financial distress and the legal redefinition of claims occur together, investors will adopt new financial contracts. These contracts may increase monitoring and control of management in response to the firms' distress, but at the same time experiment with ways to achieve this control without requiring court enforcement of the contracts. The remainder of this paper documents a case study of this type of innovation. It examines a period in the late nineteenth century in which investors witnessed widespread corporate financial distress and judicial contract redefinition, and in turn adopted a variety of new types of contracts.

3. Financial Distress and Legal Redefinition in the late Nineteenth Century

The late nineteenth century economic and legal environment produced forces likely to stimulate financial innovation: extensive financial distress along with significant redefinition of claims. In this section, I document the high level of financial distress concentrated in the largest non-agricultural sector of the nineteenth century economy (3.1), the process developed to reorganize distressed firms (3.2), and three new legal principles embodied in the rules courts adopted to resolve distress (3.3). These three new legal principles broke from previous precedent and altered the substance of previously signed financial contracts.

3.1 The extent of financial distress. Until the twentieth century, railroads dwarfed the infant industrial sector; until 1904, the book value of capital invested in the railroad industry exceeded the aggregate capital invested in the industrial sector [U.S. Bureau of the Census (1975, pp. 684, 735)]. Railroads were not only large, but also sophisticated, enterprises. Chandler (1965) describes the railroads as the "nation's first big business" and credits the railroad industry with inventing many modern corporate finance, management and labor relations practices.

Despite their size and sophistication, railroads were not immune to the pronounced late nineteenth century business cycles. Figure 1 plots the Dun and Bradstreet Business Failure Index, a measure of the number of business failures per year relative to the number of business establishments, from the 1870s through 1970. By this measure, failure in the late nineteenth century was high relative to twentieth century standards, as almost 2% of firms (excluding railroads) in any year failed.[2] Figure

[2] The Dun and Bradstreet measure excludes railroads. While the series has been redefined twice (in 1933 and 1939), Dun and Bradstreet (1946) claim that these redefinitions make fairly small changes to the overall statistics, changing the failure rate from one series to the next by at most .2%.

2 plots the mileage of U.S. railroads that defaulted on debt obligations and were in the court-run processes of reorganization during the same period. In the late nineteenth century, during severe downturns as much as 20% of miles of railroad were operated by insolvent railroads.

Together, figures 1 and 2 show that throughout the late nineteenth century, the American economy -- and especially the railroads -- experienced periodic bursts of business failure with an intensity matching any more recent experience. Both large and small railroads failed. Poor's Manual (1900, p.xcviii-ci) lists 517 railroads that defaulted on debt obligations and came under the court appointed process of receivership in the period 1884 to 1900. The average defaulted railroad owned 152 miles of road, ranging from 3 miles for the Gunpowder Valley to 4,438 miles for the Atchinson, Topeka and Sante Fe.

3.2 Equity receivership: the mechanism for reorganizing failed railroads. Despite the magnitude of business failure plaguing the economy in general and the railroad industry in particular, until the passage of the 1898 Bankruptcy Act, there was no national bankruptcy law in place for most of the nineteenth century.[3] In the absence of statutory provisions, federal courts developed a set of rules known as "equity receivership" to resolve disputes arising from financial failures of the major enterprises of their day and to create a means to reorganize these firms. Modern readers are likely to be quite unfamiliar with the details of equity receivership, therefore this section provides an overview of the steps involved in the process as background for the discussion (in section 3.3) of how equity receivership redefined existing claims.[4]

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[3] Congress passed its first Bankruptcy Act in 1800, but repealed it within three years. Almost four decades later, in 1841, a new Bankruptcy Act was passed, only to be repealed within eighteen months. After the Civil War, the Bankruptcy Act of 1867 was passed, but was repealed in 1878. Each of these three acts established procedures for bankruptcies of individuals and merchants, but not for new, large corporate enterprises. See Baird and Jackson (1990, 26-34).

[4] For a lively historical account of the development of the equity receivership process, see Martin (1974).

Figure 3 displays the steps involved in the equity receivership process. A railroad's default on its debts set into motion two distinct processes: (a) the court's appointment of interim managers who were empowered to run the railroad (the upper branch in figure 3) ; and (b) the creditors' development of a long-term refinancing plan (the lower branches in figure 3).

In response to a creditor's petition for relief, federal courts appointed an interim manager (or "receiver") to run the firm while a reorganization plan was drafted.[5] Receivers not only managed the day-to-day operations of the firm, but also, as officers-of-the-court, were empowered to break leases and contracts, retain interest payments due existing creditors, and obtain interim financing to keep the distressed railroad running. As a matter of practice, courts routinely appointed the managers of defaulted railroads as their receiver, and these receivers served for relatively long periods of time. In over 90% of receiverships from 1867 to 1897, existing railroad managers were appointed receivers. Specifically, a study of 150 receiverships found that courts appointed as receivers 80 presidents of the distressed firm, 25 former general managers, 17 former superintendents and 16 vice-presidents [Swain (1898, p. 98-99)]. Once appointed, the receiver served for an average of two or three years, but sometimes for as long as 29 years [Ripley (1915, p. 385)].[6]

While a railroad was in receivership, its creditors developed a restructuring plan. Nineteenth century reorganizations are best characterized as out-of-court settlements, in which disparate creditors met and agreed to exchange old claims for new ones, to raise new funds, and to ultimately take control of the reorganized railroad. The first steps to restructuring began with groups of bondholders joining

[5] In practice, railroads approaching default would find a friendly creditor to petition the court, so that management controlled when and with what judge the petition was filed. In 1884, the Wabash Railroad revolutionized the procedure by petitioning the court directly for its protection under receivership [Dewing (1920, 43)]. Current Chapter 11 cases can be commenced either by voluntary petition of the debtor or involuntary petition by creditors [King (1979)].

[6] Martin (1974) describes in detail the dispute surrounding the "putting in charge of reorganization the men who had got the road in a mess in the first place."

together to form protective committees, and with representatives of these protective committees forming a single, unified reorganization committee. Anyone could seek to represent a group of bond holders and rival representatives occasionally vied for support. However, normally bankers who underwrote the issue of bonds and holders of substantial blocks of bonds formed protective committees and reorganization committees [Tracy (1929, p. 13)].[7]

The reorganization committee drafted a reorganization plan, which it submitted to the defaulted firm's security holders. These plans typically proposed a series of exchanges in which the existing security holders could surrender their claims in the old railroad, perhaps along with a cash payment called an "assessment," and in turn receive claims in the new, reorganized railroad. Table 1 shows a simplified reorganization proposal.

In theory, if multiple reorganization committees were formed, investors could compare their proposals and select the best plan. In practice, however, competition was relatively infrequent[8], and therefore if only a minority of investors were dissatisfied with reorganization plan, they had little real choice. To protect the interests of investors dissatisfied with successful reorganization plans (called "dissenters"), in 1885 federal courts began to establish "upset prices" for each of the claims of the defaulted railroad. [Weiner (1927, p. 135)]. The upset price was the amount of cash a dissenting security-holder had to be paid by the assenting security holders in the event of a successful reorganization. An investor therefore chose between assenting to the reorganization plan, i.e., accepting the terms of the proposed exchange, or dissenting from the plan and receiving the cash upset value.

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[7] For examples of reorganization committees, see Campbell (1938, pp. 145-189)]. Morgan and his partners, Samuel Spencer and Charles Coster, drafted and executed the plans that reorganized or "morganized" 33,000 miles of railroad, one-sixth of the nation's roads [Chernow (1990, p. 67)].

[8] An example of competition to establish committees can be found in the 1894 Erie reorganization, in which J.P. Morgan was pitted against E. H. Harriman, who formed a rival committee [Campbell (1938, pp. 164-165)].

Once investors responded to the reorganization plan, the reorganization committee was free to either proceed with the reorganization or to propose a different plan. If the former route was followed, the legal ceremony by which a reorganization plan was ratified was through a "judicial foreclosure sale". While the title calls to mind a lively auction among many bidders, in practice, the "sale" was a mere formality as the only bidder was the reorganization committee. This fact is pointed out by virtually every writer on the subject [Cravath (1916, p. 204), Spring (1919, p. 493), Byrne (1916, p. 141), Weiner (1937, p. 137), Dewing (1934, p. 964), Lyon (1916, pp. 249-50), Joline (1910, p.87)]. At the "sale", the reorganization committee delivered to the court the securities of the assenting holders, along with cash sufficient to make upset payments to the dissenting holders and to pay off the expenses of the receivership. The old railroad and *its old obligations ceased to exist*, a new corporate entity with a new name and new capital structure was formed[9], and the receiver was removed. As we shall see, the wiping clean of old obligations played a critical role in the economics of the receivership process.

3.3 Legal redefinition of claims in equity receivership. In fashioning rules to reorganize the railroads, which were the nation's largest and quasi-public industry, judges repeatedly invoked the "public interest" as justification for their actions. Courts held that railroads could not be shut down, liquidated, or torn apart without harming their users and the economy [Spring (1919, p. 498)]. Yet public interests and private interests of security claimants need not be coincident. In this section, we see how the mechanism of equity receivership, as developed by the courts, compromised the rights of

[9] The new and old firms often had very similar names, presumably to minimize any confusion by its former customers. For example, Caldwell (1896) notes that the Memphis & Little Rock Rail*road* Company was reorganized in three different foreclosures over the years. Its three incarnations were as the Memphis & Little Rock Rail*way* Company, the *Little Rock & Memphis* Rail*road* Company, and finally the Little Rock & Memphis Rail*way* Company.

security holders and redefined the terms of previously existing securities. Specifically, we observe the redefinition of seniority with supersenior claims, the redefinition of security through reordering of claims, and the redefinition of value through deliberately low upset values.

Redefining seniority with supersenior claims. During the years in which a failed railroad was under the control of a court-appointed receiver and prior to its reorganization and refinancing, the railroad's on-going operations demanded that new funds be raised to pay for operating expenses and capital improvements. Existing suppliers of material and equipment would not wait years to be paid, the court had no funds of its own to advance, and failure to raise funds for working capital could cripple the railroad.

Yet, with an overhang of prior senior debt claims, new lenders would be unwilling to take subordinate claims in a very risky firm. This theoretical insight was formalized by Myers (1977), and it was observed in practice. In the nineteenth century, railroads approaching distress found new funds either very expensive or simply unavailable. For example, in the 1870's, the distressed Erie Railroad sold 7% bonds at a 47.5% discount [Dewing (1920, p. 108)]. Investors apparently demanded an effective interest rate of 13.3% when "average" railroad bonds yielded 7.6%. Other firms approaching distress, such as the Philadelphia & Reading Railroad could find willing lenders at no price [Dagget (1908, p. 81)].

To fund the railroads' real cash needs, yet also meet investors' demands, the courts permitted receivers to issue receivers' certificates, by which the railroad borrowed from investors against the credit of the "whole estate" of the railroad. The first mention of these supersenior borrowings, comparable to today's debtor-in-possession (DIP) financing, was their issuance in 1872 (cited in Meyer v. Johnston 53 Ala, 237 (1875)). Receivers' certificates became the normal form of interim financing for failed railroads in the 1880s and after [Dewing (1920, p. 103), Ripley (1915, p. 386)].

A receiver's right to issue supersenior claims, especially without the permission of the mortgagees, was hotly contested in the courts from at least 1872 to 1886. Within the legal and financial communities, the issue was both unsettled and contentious. Among jurists, it was a highly important subject because it was not only a "violation of the established principles of the law of liens" but also "a striking example of judicial legislation" [Carr (1895, p. 3)]. As late as 1884, the financial community continued to express surprise and indignation over this development:

> Prominent among the events of the week affecting investors' confidence in Wall Street values, has been the issue of receivers' certificates by the Wabash Railroad for its floating debt... (S)hoving in, ahead of bonds, receivers' certificates...is quite a new sensation to the average investor...(W)e fail to understand how a certificate like this could be authorized in any proceedings in which the bondholders were not actually or constructively parties. [The Commercial and Financial Chronicle (June 21, 1884, p. 720)]

It was not until the case of Union Trust Co. v. Illinois Midland Co. 117 U.S. 435 (1886) that the U.S. Supreme Court ruled on the federal courts' right to issue receivers' certificates over the objections of bondholders. The Court ruled that bondholder "consent is desirable, but is seldom practicable." In a review of this and other U.S. Supreme Court decisions from the 1870s and 1880s supporting receivers' certificates, Dewing (1920, p. 105) writes:

> It is this power of the courts... that jeopardizes both the spirit and the letter of railroad mortgages...It has been called the 'extreme limit of the most extraordinary powers of a court of chancery.'[10] Quite so, and one might call it an unjustifiable emasculation of the substance of presumably inviolable contracts.

Redefining security. By nineteenth century custom, railroad debt was almost entirely in the form of mortgage bonds [Dewing (1934, p. 249)]. A single railroad may have issued dozens of different first and second mortgage bonds, each secured by specific lengths of track, terminals, or rolling stock. Yet as late as 1879, a major text made clear that American securities law had only recently come to be clarified:

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[10] Dewing here cites A. W. Machen, Jr. A Treatise on the Modern Law of Corporations (1908).

> The securities considered in this book are of quite recent origin...Prior to the year 1860, the courts had only in a few instances been called upon to enforce Railroad Mortgages; and the cases adjudicated since 1870 are far more numerous than all that have been decided before that time. [Jones (1879, preface)]

The rights of mortgage holders, and the meaning of a security interest, were examined and narrowed in a series of decisions handed down in connection with railroad reorganizations.

In relatively early rulings, the courts held that holders of defaulted railroad mortgages -- unlike the secured holders of other firms' securities -- could not exercise their liens, seize the asset, sell it, and collect the proceeds. The public interest in maintaining the railroads in operation and the perceived damage to the transportation system of dismemberment led the courts to deny holders of railroad mortgages the right "to have separate sales of the constituent parts <u>as they were strictly entitled to do</u>" [Spring (1919, pp. 492, 498)].[11] In 1877, commentators remarked "several years ago" investors had first learned that "bondholders have no effectual way of getting possession of the property if they wish to do so" ["Railroad Mortgages as Securities," <u>Commercial and Financial Chronicle</u>, May 26, 1877, p. 480.]

Once kept together, the distressed railroad needed to purchase labor and supplies to continue operations, and it could not afford to alienate its existing suppliers. While receivership certificates supplied a defaulted road with new monies, in concept none of these funds could be paid to unsecured claimants before the secured holders were paid. Thus, trade creditors, as unsecured creditors, could not be paid before the mortgagees. According to Metcalfe (1894), prior to 1878, no judicial decision failed to recognize the principle that legal rights acquired under a mortgage could not be impaired by unsecured claims. However, in 1878, in the case of <u>Turner v. Indianapolis Railway</u> 8 Biss. U.S. 315 (1878), the Supreme Court held that certain classes of unsecured debts previously incurred by the railroad could be paid without regard to prior liens held by mortgage bondholders. The following

[11] An early case which raises this issue is Munn v. Illinois 94 U.S. 113, 125 (1876), in which the Court held that holders of conflicting liens could not break apart a railroad and force sale of the separate parts.

year, in the landmark case of Fosdick v. Schall 99 U.S. 235 (1879), the Supreme Court affirmed that certain unsecured creditors could indeed be repaid by the receiver before payments were made to mortgage bondholders. In Fosdick, the unsecured claimant whose payment was affirmed had supplied the railroad with railway cars.

Over the next two decades, in dozens of cases, the exact types of unsecured debts that might receive priority (e.g., taxes, wages, payment for rails and railway cars, charges for connecting lines) and the time period in which the court was free to look back were adjudicated. Two decades later, the exact meaning of Fosdick was still murky. Judges exercised wide latitude in their interpretation of the law, according to a contemporary legal observer (Dickson (1896)), who commented:

> The decisions of the federal circuit courts have reflected the uncertainty of the Supreme Court, and the fate of each claim has depended to quite an extent on the ideas of the judge who happened to be sitting in the case.

From the perspective of a holder of mortgage bonds, the Fosdick case represented a radical redefinition of the concept of security: some unsecured claims would be paid off before secured creditors were paid. Furthermore, given the great legal uncertainty surrounding the actual execution of the concept articulated in Fosdick, bondholders could hardly have known what claims would or would not be granted precedence if default were to occur and the firm were under a receiver's control. The Commercial and Financial Chronicle in a series of articles expressed investors' confusion. One article from the mid-1880s expresses the sheer dismay of investors who had recently lived through a surge of railroad failures:

LESSONS OF RAILROAD DEFAULTS

> Among the things learnt (sic) in each period are, that a bond is not always what it seems to be or professes to be -- that the security which it nominally possess may be no adequate security; that priority of lien is not necessarily a bar to subordination of the lien to obligations subsequently created; that a mortgage does not convey all the property of a corporation even if in general terms such conveyance has apparently been made; and that the character of different types of obligations and their relation to specific liens on particular property are by no means clearly defined. [Commercial and Financial Chronicle, August 30, 1884, p. 3]

Redefining value through upset prices: assessments and judicial coercion. The third way in which courts redefined investors' rights in the late nineteenth century was through the deliberate misvaluation of claims which permitted the reorganization committee to coerce cash payments from junior creditors.

Upset prices were first introduced in the federal courts in 1885 [Weiner (1927, p. 136)], and subsequently became widely used. The court set an "upset price" for each claim, which established the cash payment a successful reorganization committee was required to pay to security-holders who did not assent to the reorganization plan. In setting upset prices, judges explicitly traded off protecting the rights of the minority (the dissenters) against ensuring a successful reorganization. Higher upset prices would protect dissenters but would make a successful reorganization less likely.

Four competing legal theories of upset values produced a wide discrepancy in practice and gave judges great latitude in setting the actual prices. Upset prices could reflect scrap values, on-going value, a purely "nominal value," or the "highest figure which will permit the reorganization to succeed" [Weiner (1927)]. In practice, courts leaned toward low upset values [Joline (1910, p. 83)]. Weiner (1927, p. 143) reports evidence that upset values typically ranged from 10% to 80% of the traded market value of the claims.

By setting upset values well below market value, judges permitted reorganization committees to coerce cash payments from existing claimants. An example clarifies how this process worked. Suppose an investor has a claim with market value of $40, and the court sets its upset value at $10. The reorganization committee proposes that the claimant pay $29 in cash (an "assessment") and receive a claim in the new firm worth $40. The claimant has two choices: accept the $10 cash upset value, or net $11 by paying an assessment of $29 and receiving the new claim. Recall from the description of the process in section 3.2 that the investor cannot simply hold onto his existing claim, because the claim and the issuing firm cease to exist after the foreclosure sale.

Monies raised by assessing existing claimants were a major source of the new funds raised by newly reorganized railroads to pay off non-assenting security-holders and holders of receivers' certificates, and to fund capital expenditures on the reorganized railroad. While assessments on security holders were used to raise funds as early as 1862, they were used extensively in financing the reorganizations of the 1880s and especially the 1890s, when upset prices were set [Dewing (1920, pp. 109-115)]. Typically, new cash was raised through assessments rather than issuance of securities to unrelated parties [Ripley (1915, p. 396)]. Dagget (1908, p. 352) reports that eleven of fourteen of the major 1890's railroad reorganizations assessed security holders to raise funds, and Poor's Bureau (1900, p. xx) reports that $96 million in new funds were raised through assessments by 37 of the 57 railroad reorganized in the 1880s and 1890s.[12]

Usually only junior claimants were assessed. Of the $96 million paid in assessments, $87 million came existing stock holders (common and preferred), and $9 million from bond holders [Poor's Bureau (1900, p. xx). Junior claimants were more "assessable" because their bargaining position was the weakest. With upset values set equal to or near zero, junior claimants effectively could either pay the assessment and continue to invest, or take a complete capital loss [Dagget (1908, p. 351)]. Senior claimants with higher upset values could more credibly demand cash, and were less likely to be assessed.

By setting low upset values, the courts overcame a key obstacle to successfully reorganizing the railroads: motivating investors to supply the distressed firm with new capital. Claimants, especially junior claimants, whose upset values were deliberately set at low levels were easily motivated to pay assessments. In the example given at the beginning of this section, the investor paying a $29 assessment and receiving $40 in securities would earn a return of 38% (=$40/$29 -1). A

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[12] Unfortunately Poors does not report the dollar value of securities issued to the public for cash as part of these reorganizations.

study by Dagget (1908) shows that the average holder earned a 107% annualized return from paying an assessment and holding the security for six months.[13] More compelling evidence that assessments were positive net present value investments lies in the fact that unsecured creditors not offered the right to pay assessments and participate in the reorganization sued to gain this right. See Louisville Trust Co. v. Louisville, New Albany and Chicago Railway Co 174 U.S. 674, (1899), and Northern Pacific Railroad Company v. Boyd 228 U.S. 482 (1913).

However, going back to the example cited at the beginning of this section, the claimant must pay $29 in cash to effectively continue to hold their claim with a market value of $40. Put another way, in the example, the investor gives up a $40 market value claim plus $29 in cash to receive a $40 claim. It is the destruction of prior claims at the end of the reorganization process, along with the deliberately low valuation set by upset values, that effectively makes the old claim worth $40 suddenly worth only $10, its cash upset value. Thus, court actions made "compulsory" assessments feasible and thereby created "one of the most useful tools of the majority for forcing recalcitrants into line" [Weiner (1927, p. 145)].

3.4 Summary: Distress and Redefinition of Claims. The legal principles the federal courts embraced to rehabilitate the railroads represented significant departures from past practice. A crude measure of the importance of the earliest cases on receivership law is the incidence with which later federal and Supreme Court cases refer back to these rulings. To the extent that the legal principles articulated in 3.3 are important and novel, they should be cited actively for years to come at a level higher than for the "average" case. Figure 4 shows the subsequent federal court citation history of eight key railroad receivership cases against the average citations to five randomly selected sets of

[13] These results are curious, because stockholders who paid assessments would have been better off to not pay the assessment, wait one month and then purchase the stock in the market.

eight comparable cases. The eight receivership cases are the earliest cases that speak to courts' rights to permit the issuance of receivers' certificates and to grant unsecured creditors priority over secured creditors. The comparable cases are five sets of eight cases each, where each of the eight cases matches the receivership cases in year decided and venue. The comparable cases were selected randomly from all matching cases, excluding the eight receivership cases.

Figure 4 suggests that during the last decade of the nineteenth century, the decisions of the prior two decades were still actively cited, especially in periods of renewed financial distress, and that their citations were indeed higher than for comparable cases. Figure 4 cannot show the intensity of ongoing uncertainty and controversy that the early equity receivership decisions generated. For example, Mr. Fosdick's claim arose in 1873, his case was decided by the Supreme Court in 1878, and as late as 1905, courts were still debating which unsecured claims could be advanced in the priority queue [Byrne (1917, p. 122)].

The decisions of the court regarding seniority, security, and valuation were not merely matters of theoretical interest to lawyers. The nineteenth century financial press, writing to an audience of investors, expresses its editors' and its readers' bewilderment that courts could modify the substance of previously made, well-written contracts:

> So far as these difficulties (in obtaining their rights) arise from the nature or wording of the instrument, the purchasers are not wholly without blame...But a point of more present interest is the disposition shown... to throw difficulties in the way of enforcing the rights of bondholders, even when the defects...are not found in the mortgage deed...(The bondholder is) involved in a maze of legal proceedings which are clear as to nothing except that they consume costs and time, uncertain whose interests are identical with his own, and whose are contrary to his own, compelled to choose between putting in more money as assessments to carry on the contest or to abandon his investment as hopeless ["Railroad Mortgages as Securities," Commercial and Financial Chronicle, May 26, 1877, pp. 479-480.]

In summary, the evidence points to the conclusion that the late nineteenth century witnessed not only a rise in financial distress, but also the development of new legal principles that weakened the effectiveness of previously written contracts. Based on the discussion in section 2, we would therefore

expect to observe a flurry of financial innovation and the popularization of new securities in response to these legal changes.

4. Financial innovations: response to distress and contract redefinition

In the 1880s and 1890s, legal developments in equity receivership provided investors with new information about the effectiveness of various types of contracts that should have affected the contracting choices selected by investors. This section documents that during the period in which new information was revealed, new types of contracts were rapidly adopted by investors refinancing distressed firms consistent with the idea that distress and contract redefinition affect the *timing* of the adoption of innovations (section 4.1). I then argue that the *form* of new contracts adopted by distressed firms reflects a response to distress and contract redefinition, which would lead investors to protect property rights outside of the courts (section 4.2), while at the same time to increase monitoring and control over management (section 4.3).

4.1 The timing of the adoption of innovations. Nineteenth and early twentieth century scholars have identified a number of relatively new financial practices popularized in connection with late nineteenth century railroad reorganizations. The list includes contingent charge securities (preferred stocks and income bonds), voting trusts, certain bond covenants, and deferred interest debt instruments. (See table 2). In part, empirical evidence can confirm or contradict the anecdotal claims that the distresses of late nineteenth century railroads spurred the adoption of new contracts.

If distress and contract redefinition led to the adoption of new contracts, then usage of innovative securities should be higher after each of the bursts of financial distress in the three final decades of the nineteenth century. To test this proposition with data available for the 1870-1890

period[14], I examine the link between distress and the usage of contingent charge securities (preferred stocks and income bonds.) I investigate (a) whether railroads made greater use of contingent charge securities when they emerged from rather than entered distress, and (b) whether distressed railroads adopted these instruments earlier than other railroads.

To test the first of these propositions, I identify three samples of railroads that failed and were reorganized in each of the three peaks of railroad distress in the 1870s, 1880s, and 1890s. I examine the railroads' balance sheets (in book values) at common points in time prior to entering receivership and subsequent to exiting receivership. For example, the 1870s "distressed" sample includes fifteen railroads that fell into difficulty in 1873 through 1875. I examine the 1872 balance sheets of these railroads (before the first of any of their defaults), and their 1882 balance sheets (after the last of all of their reorganizations.) This pre- and post- comparison addresses whether the contingent charge securities were used more extensively after rather than before these railroads experienced distress.

To test if contingent charge securities were adopted earlier among distressed firms, I compare, at each date, usage of contingent charge securities by distressed railroads with usage by a control sample of railroads at the same points in time. For the 1880s and 1890s, the comparison set is the aggregate balance sheet for all railroads, as taken from the Interstate Commerce Commission's Statistics of Railways in the United States (1890,1900) and the Bureau of the Census' Report on the Agencies in the United States (1880). As aggregate data is not available for the 1870s, the comparison sample for that period is a matched sample of railroads that mirrors the distressed railroads in mileage, geography and organizational form, but which did not default on debt obligations in the 1870s.

Table 3 describes the relevant samples and provides summaries of the balance sheet

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[14] The primary sources of financial data for this period are Commercial and Financial Chronicle and Poor's Manual. While these two sources provide sufficient information to identify contingent charge securities, neither source provides sufficient information to study bond covenants, voting trust agreements, or deferred coupon debt features.

comparisons, which are displayed graphically in figure 5. The data show that railroads used more contingent charge securities upon leaving, rather than entering, distress. For example, for railroads defaulting in the 1870s, under 8% of their capital structure was made of contingent charge securities in 1872 prior to entering distress. In 1882, after all of the fifteen railroads had reorganized, contingent charge securities accounted for over 25% of their capital structure. This pattern, of firms substantially increasing their use of contingent charge securities after leaving reorganization, is consistent for each of the samples of failed firms studied.

By comparing the failed railroads with the control samples, we can contrast the rate at which distressed firms adopted contingent charge securities with the rate at which non-distressed firms adopted them. For example, in the 1870s, while distressed railroads boosted their use of contingent charge securities from 7.8% to 25.3%, a matched sample of railroads increased their usage of these securities from only 1.1% to 2.4%. While railroads generally increased their use of contingent charge securities over the final three decades of the century, troubled railroads adopted contingent charge securities earlier.

Over time, however, this disparity in adoption rates between distressed firms and comparable railroads narrowed considerably. Table 3 also includes data on distressed railroad balance sheets around a downturn in the 1910s. In this later decade, the balance sheets of distressed railroads entering and leaving distress look very similar to those of the average U.S. railroad. These results are consistent with the perception that the diffusion of at least one class of innovative securities -- contingent charge securities -- was associated with railroads' financial distress. The evidence supports the notion that these innovations were adopted first and most rapidly among distressed firms, and later became more broadly diffused throughout railroads.

Leavitt (1941) reports a similar pattern of rapid adoption of new financial contracts among distressed firms in his study of voting trusts. This nineteenth century innovation separated voting

rights from shares, by turning voting rights over to a handful of professional, experienced trustees. Leavitt (1941, pp. 35-36) reports data on 138 business trusts set up between 1864 and 1939. He concludes his statistical analysis of the 138 voting trusts with this analysis:

> (T)he voting trust was first used in connection with the railroad consolidations and reorganizations between the Civil War and 1880; but not until the late eighties and nineties was it popularized by the railroad reorganizations of the period. Following 1900 trusts were commonly used in public utility and industrial reorganizations, and at times, under other circumstances; while after 1923 they were used more commonly in corporate promotions.

As with contingent charge securities, distressed railroads were early adopters of voting trusts. The innovation was subsequently adopted by firms in other industries and circumstances.

Finally, limited data suggests that three different types of deferred coupon debt -- akin to today's stepped coupon bonds, pay-in-kind bonds, and original issue discount debt obligations -- were almost exclusively popularized in conjunction with the railroad reorganizations of the 1880s and 1890s. First, with "adjustment bonds" (comparable to today's stepped coupon bonds), existing bondholders in reorganizations accepted temporary reductions in interest with the coupon rate stepping up over time as the firm was expected to regain its financial strength [Lyon (1916, p. 294)]. Second, reorganizers often paid interest on existing bonds with additional bonds, like today's pay-in-kind bonds. For example, the Erie Railway reorganization of 1875 paid interest on junior bonds by issuing the holders new 7% bonds. This method became common in railroad reorganizations of the 1870's and 1880's [Dewing (1920, p. 132)]. Third, reorganizations occasionally issued bonds with extremely long maturity bonds (maturities exceeding 100 years) but low interest rates. Some low-interest, long-maturity bonds were issued in conjunction with the railroad reorganizations of the 1880s, but the method was popularized by reorganizations of the 1890s [Dewing (1934, pp. 224-228)]. I find no evidence that these three types of deferred interest securities were issued by corporations extensively in the nineteenth century prior to their popularization in reorganizations.

Taken together, the data on the usage of contingent charge securities, the 1941 Leavitt study of

voting trusts, and the absence of corporate deferred interest securities prior to their use in late nineteenth century railroad reorganizations support the claim that a variety of new contracts were popularized by nineteenth century firms emerging from distress.

4.2 The form of innovation -- circumventing the courts. As argued in section 2, if innovations are responses to legal redefinition of rights, their form should demonstrate attempts to reduce subsequent redefinition. One way to avoid allowing courts to redefine claims is to stay out of court. Deferred interest and contingent charge securities serve this purpose by making default and therefore judicial involvement less likely.

Deferred interest securities reduce cash interest payments, and thus quite simply reduce the likelihood of short-term renewed default. In return, the investors of these instruments -- former senior creditors who accepted the instruments in exchanges -- appear to have locked-in long term investments perceived to be attractive:

> Reorganization mortgages . . . tend to be large mortgages at a lessened rate of interest. They are also blanket mortgages with an inferior lien. Some inducement besides the compulsion of necessity is useful in securing the assent of old bondholders to the proposed exchanges of these bonds for outstanding securities. The long-term bond protects the holder against the probable steady fall in the rate of interest on capital.[15] It promises him advantage in the future in return for surrender in the present. [Dagget (1908, p. 365)]

While deferred interest debt change the level of annual cash payments, contingent charge securities change the legal status of these payments. Contingent charge securities permit annual cash servicing to be skipped completely without giving rise to default requiring court intervention. With income bonds, interest is due only if the issuer earns sufficient accounting earnings, otherwise failure

[15] It is not clear why investors believed that interest rates would fall. Perhaps they anticipated that economic recovery would be associated with lower interest rates. A second possible explanation is that as a distressed railroad's financial position improved, its credit rating would rise and therefore shorter term investments would not permit holders to lock-in the high "low-credit" returns. I am indebted to Margaret Levenstein for pointing out a third explanation. Perhaps the market believed its economists; David Ricardo's theory of falling profits would be consistent with expectations of falling interest rates.

to pay interest is not a condition of default. Preferred stocks have no accounting test for payment nor can failure to pay dividends necessitate court involvement, however failure to pay dividends does trigger out-of-court remedies, as will be discussed in section 4.3.

Distressed railroads' adoption of both deferred interest and contingent charge securities reduced the likelihood of railroad default and subsequent court involvement. First, as table 3 shows, fixed charges were replaced with contingent charges. Furthermore, by substituting deferred interest obligations for current-pay obligations, annual charges on the remaining fixed rate debt decreased. Table 4 shows that 57 major railroads, reorganized in 1884 through 1900, substantially reduced not only the absolute level of their debt, but also the annual interest charges on the debt and the level of indebtedness relative to fixed assets [Poors (1900, p. lxxvi)]. For the average railroad in table 4, post reorganization earnings could drop 35% from the level that would have caused default prior to reorganization without triggering default.[16] The adoption of deferred interest bonds and contingent securities made default less likely, and thus reduced the probability that courts would have rights to insert supersenior claims, reorder secured and unsecured claims, or deliberately undervalue claims.

The ultimate failure of one nineteenth century innovation provides additional evidence that the innovations popularized by distressed railroads were motivated by a desire to avoid court intervention. Income bonds fell into disfavor early in the twentieth century [Dewing (1911, p. 397)], even though federal income taxes, first levied in 1913, favored bonds over stocks. The rights of income bond holders are contingent on accounting results, but firms could manipulate earnings.[17] McConnell and

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[16] In the aggregate, table 4 shows that firms prior to reorganization needed earnings of $67.8 million to make interest payments. After reorganization, earnings could drop 35% below this level, to $43.8 million, and the firms could pay sufficient interest to avoid default.

[17] Railroads could redefine "capital improvements" as "maintenance expenses." In Union Pacific Railroad Co. v. U.S. 99 U.S. 420 (1878), the court held that the latter reduced the income to which an income bond holder claim, but the former did not. Earnings could also be hidden through a variety of transfer prices. For example, the Supreme Court of Georgia found that the Central of Georgia Railroad, which reported five year cumulative earnings of $32.95, actually had earned $1,321,934 and thus had defrauded its income bond holders [Dewing (1911, p. 404)].

Schlarbaum (1981) argue that the market could appropriately price the likelihood of gaming against the contract, so the small direct deadweight costs of enforcement -- legal costs -- are the only ones that are relevant in explaining the absence of income bonds. This analysis ignores the other cost, or more accurately risk, of income bonds: enforcement requires court intervention which introduces great uncertainty. Stetson (1916, pp. 69-70), the foremost corporate lawyer of his day who was known as "Morgan's attorney general" [Campbell (1930, p. 148)], made clear the real problem with income bonds was going through the courts to enforce them:

> Much litigation in respect of income bonds has arisen because of the disputes as to the computation of earnings...The case of Mackintosh v. Flint & P.M.R. Co...illustrates the difficulty of determining the amount of net earnings, and the difficulty even greater of finding a judicial officer fully equal to solving the problem.

If the goal of the deferred interest and contingent charge securities was to *reduce* court intervention and the uncertainty it created, then income bonds' ultimate failure was that they *required* courts to enforce their terms.

4. 3 Form of innovation -- increasing control and monitoring. By giving firms additional flexibility in the form of looser interest and contingent charge requirements, court intervention may have been reduced. However, if the innovations were responses to both court actions *and distress itself*, they should have also evidenced investors' desires to more carefully monitor and control the rehabilitated firm. We see evidence of this goal in the late nineteenth century adoption of new covenants, preferred stocks with control features, and especially voting trusts.

The railroad reorganizations of the 1890s produced many new covenants in securities contracts, as discussed by Rogers (1965), Draper (1930), Stetson (1917), and others. It is obvious that covenants can control the conflicts among security holders and give stock holders value-maximizing incentives [Smith and Warner (1979)]. If we look at a few of the 1890s covenant innovations, we see

evidence of investors seeking direct control over firm actions, requiring that firms consult with claimants before making certain decisions.

By the 1890's, all reorganizations that issued preferred stock protected preferred holders "from future introduction of new bonds between them and their property" [Dagget (1908, p. 367)]. In most instances, a majority of preferred holders needed to approve any new issue of preferreds or mortgages [Lyon (1916, pp. 23-4)]. This type of financing constraints forced managers to get explicit approval before creating new senior claims. Unless they could sell equity, managers either lived within tight cash flow constraints or gave preferred stock holders a say in what new funds could be raised.

In addition, preferred stocks created in the 1890s by formerly distressed firms gave voting rights, and even control, to preferred stock holders upon failure to pay dividends. The reorganization of the Norfolk and Western Railroad is called "fairly typical" of the 1890's preferreds [Dewing (1934, p. 195)]:

> The holders of the adjustment preferred stock are to be entitled during the period of five years after the reorganization of the new company, unless three full yearly dividends of 4% per annum shall have been paid on the adjustment preferred stock before the expiration of the period, to elect two-thirds of the whole board of directors.

Thus, preferred stock holders traded the right to throw the firm into receivership for control of the entire firm if their dividends were not paid, even though the firm was not in default to any creditor.

Merely giving security holders the right to vote will not lead to better monitoring, unless voters are informed, competent and motivated. To create better monitors than dispersed shareholders, voting trusts empowered professional monitors. Shareholders received dividends, but their votes were cast by three to five trustees [Mead (1920, p. 457)]. These trustees were acknowledged experts, such as J.P. Morgan and his associates, who were empowered for five years or until regular dividends resumed.[18] Over half of the reorganizations in the 1890s employed voting trusts and, by 1908, they

[18] J.P. Morgan was personally a trustee for the Philadelphia and Reading (1886), Chesapeake and Ohio (1888), Southern Railway (1894), Erie (1895), Northern Pacific (1896) and the Reading (1896) [Leavitt (1941, p. 23)].

had come into general use in reorganizations [Dagget (1908, p. 382)].

The intent of the voting trusts was clear: to create a vigilant and active set of monitors to safeguard investors' interests. While trustees legally represented the shareholders, in fact, they served to protect bondholder interests. Cushing (1927, p. 15), a staunch supporter of voting trusts, plainly admits this purpose:

> Ordinarily, the object aimed at in a voting trust has been the protection of bondholders, not indeed by actually improving in any technical manner the status of their securities, but chiefly by procuring for them such practical advantage as may arise from a well considered conduct of a corporation's affairs.

The most senior creditors reorganized the firm and controlled the reorganization plan. The reorganization process enabled them to encourage former junior claimants and former shareholders to pay assessments and receive common shares. However, by placing voting power in the hands of men chosen by the creditors -- and whose interests were at least as close to the creditors as to the shareholders -- the voting trust could be used by creditors to ensure that the firm was well and conservatively run.

In summary, we can conclude that in the late nineteenth century, a group of financial innovations was popularized by firms emerging from distress. Furthermore, these financial practices granted firms more financial flexibility so as to avoid default, yet at the same time created more effective means to monitor and control management. These traits are those which would be expected had the combination of distress and legal redefinition of claims stimulated the innovations.

5. Conclusion

The history of the late nineteenth century American economy is a case study of institutions and markets adapting to change. The largest enterprises failed, and their failure threatened the

continued growth of the nation. Courts, acting to safeguard the public interest, stepped into the void left by the failure of Congress to pass legislation regulating bankruptcy. Judges quickly determined that to keep a distressed railroad running, new funds had to be raised and suppliers paid. Accordingly, they modified seniority and security provisions so as to ensure continued flows of new funds and materials. To ensure the equitable treatment of parties who disagreed with reorganization proposals, but not to allow minority claimants to thwart a successful reorganization, the courts instituted upset values, but set them at levels below current market prices.

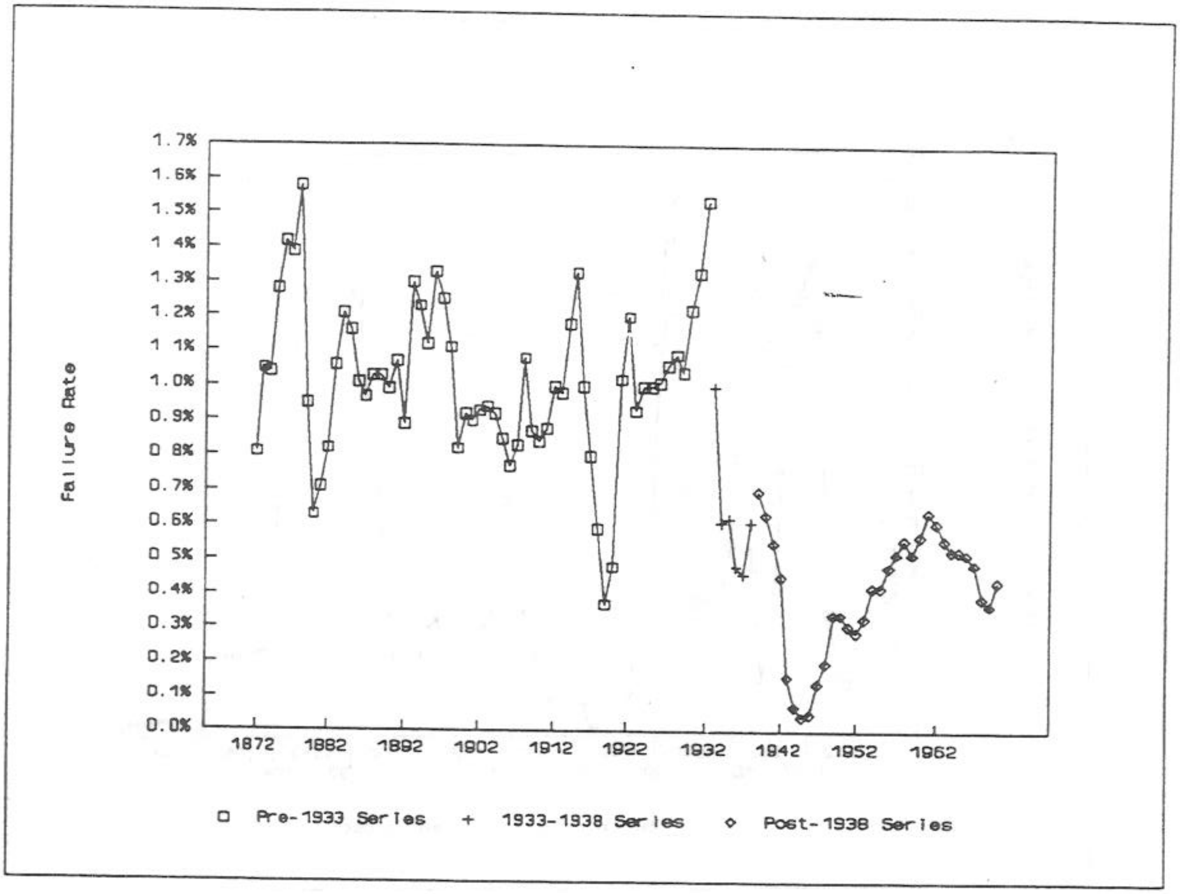
While the legal environment of the 1890s is vastly different from that of the 1990s, the problems the courts faced a century ago may be instructive in the current debates over modifications to the bankruptcy code. For example, Roe (1983), Bebchuk (1988), and Easterbrook (1990) among others, discuss replacing Chapter 11 with an auction process. Nineteenth century judges administered "auctions" for the sale of assets, and had to answer a number of specific questions: Can existing security-holders bid? If so, can they use their existing claims as scrip? If so, how much are these claims worth? What if only one bidder shows up? A closer examination of the workings of the equity receivership process may highlight potential problems in implementing auction-based bankruptcy schemes.

Nineteenth century capital markets reacted to firms' distress as well as to institutional response embodied in new legal rules on financial contracting. At a general level, the financial innovation this paper documents illustrates a market adapting to changes in the political economy, in a fashion consistent with that described by Kane (1986) and Miller (1986). However, in the late 1800s, the market reacted not to taxes or regulation, but rather to changes in security holders' property rights brought about through the equity receivership process. I argue here that the timing and form of specific financing and corporate control practices adopted in the nineteenth century are consistent with investors' learning about a new legal system which redefined property rights. Investors desired to

avoid future distress that would require court intervention and did so through adopting deferred interest bonds and contingent charge securities. However, the necessary loosening of some financial constraints by these instruments was accompanied by other actions to ensure greater monitoring and control. New covenants warned of imminent problems, and terms of preferred shares permitted their holders to take control of the firm before default occurred. Voting trusts concentrated monitoring to prevent future disasters, similar to the LBO associations praised by Jensen (1989). In total, nineteenth century capital markets displayed remarkable sophistication in defining corporate control using instruments far sharper than "plain vanilla" debt and equity contracts.

Figure 1

Dun and Bradstreet's Business Failure Index, 1872 - 1970

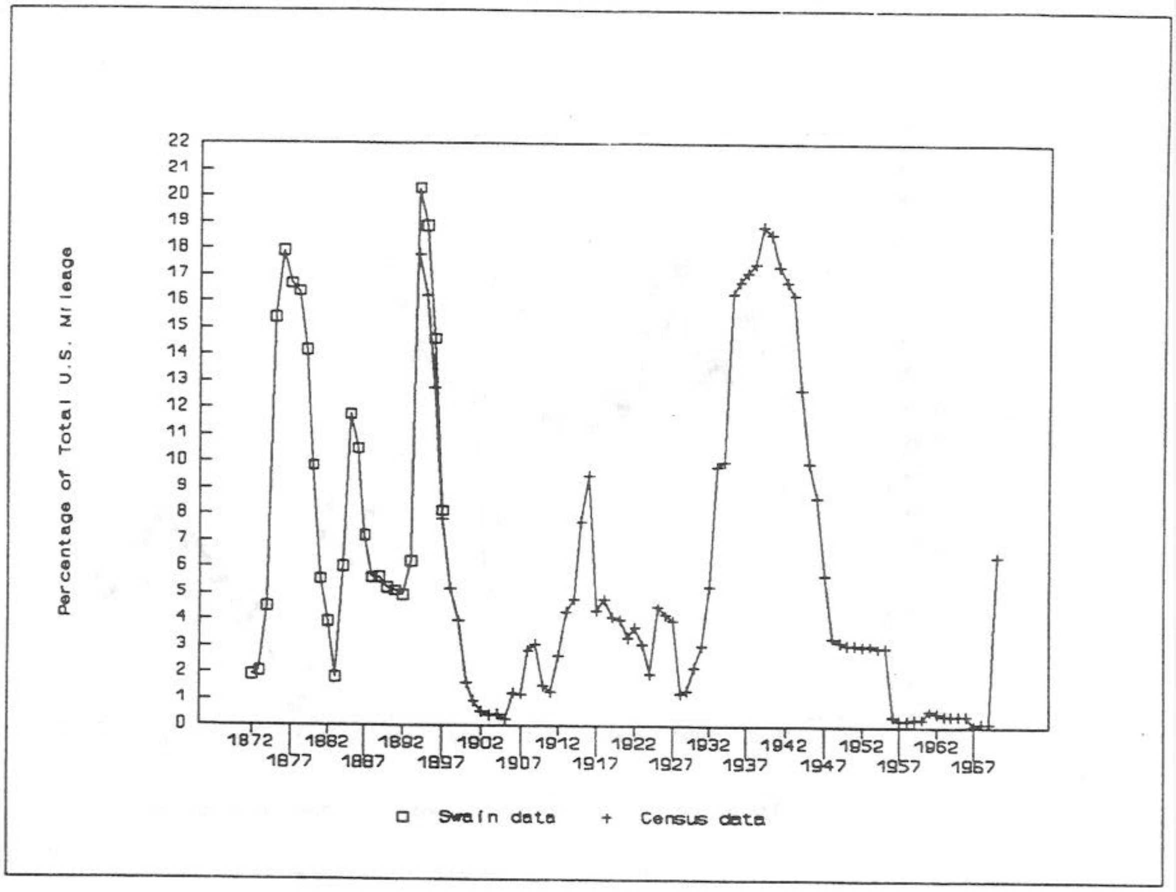


Source: U.S. Department of Commerce, Bureau of the Census (1975,House Document No. 93-78, vol. 2, pp. 913-914).

Note: Dun & Bradsteet's business failure index divides the number of total failures by the total number of industrial and commercial enterprises, excluding railroads and banks. "Failures" include discontinuances following bankruptcy petitions, foreclosures, receivership, out of court agreements with creditors, assignment and attachment of goods, voluntary withdrawals with known loss to creditors, etc. In 1933, Dun & Bradstreet redefined its series and no longer included real estate companies, holding companies, steamship lines, terminals, amusement places and various other concerns from its coverage. They report that this change in the series lowered the observed failure rate by .02 to .03%. In 1939, they added to the list of failures voluntary discontinuances with loss to creditors and assorted other events which would result in loss to creditors. This change raised the index by "about .16%." (Dun & Bradstreet (1946)). Because of these two modifications of the index, the data for the various periods are shown separately.

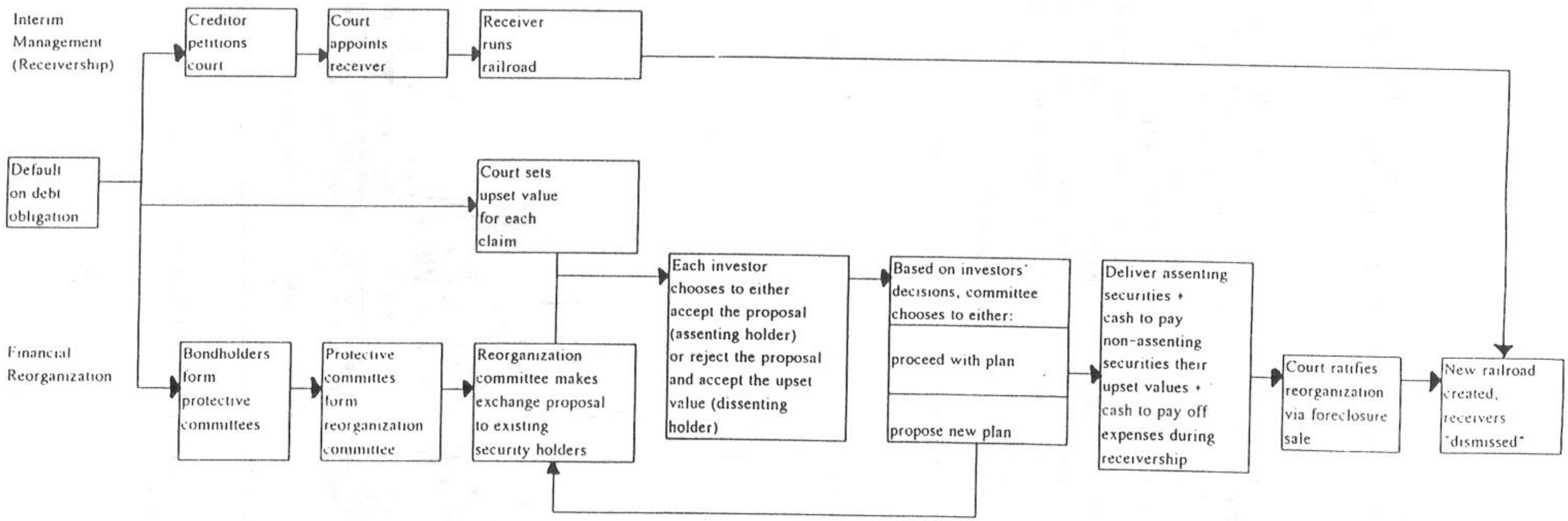
Figure 2

The percentage of U.S. railroad mileage under the control of court-appointed receivers or trustees, 1872-1970



Sources: Swain (1898) for data from 1872 to 1897; U.S. Commerce Department, Bureau of the Census (1975, pp. 727-733) for data from 1894 to 1970.

Figure 3
Late Nineteenth Century Railroad Reorganization Processes

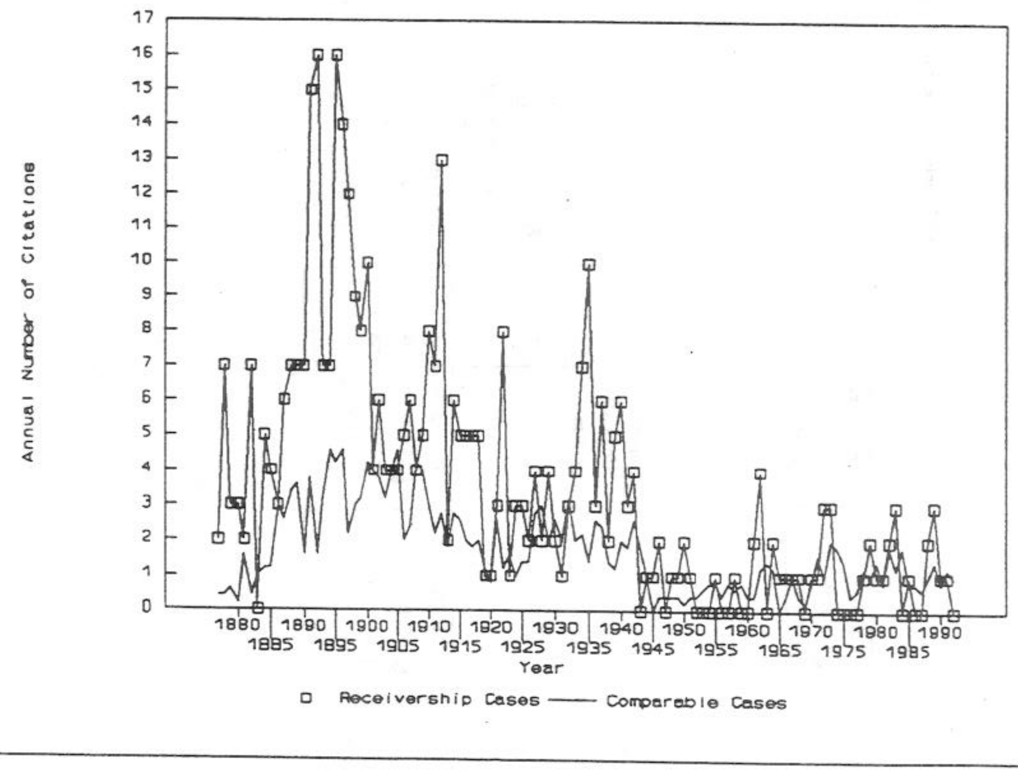


Note: Actions and decisions by federal courts are indicated by shaded boxes.

Figure 4

The number of citations to early cases in railroad receivership law in subsequent federal court cases, 1875 through 1991, as compared with citations to randomly selected sets of comparable cases.

This chart reports, for each year, the number of federal court decisions (U.S. Supreme Court, U.S. Court of Appeals, circuit courts of appeals, district courts, and U.S. Bankruptcy Court) which cite at least one of eight early cases in receivership law. The eight cases address the rights of the court to either permit the issuance of receivers' certificates or to grant unsecured creditors priority over secured creditors, and were all decided in the period 1875 through 1885. The eight cases were Meyer v. Johnson (1875), American Bridge Co. v. Heidelbach (1876), Wallace v. Loomis (1877), Fosdick v. Schall (1878), Miltenberger v. Logansport (1882), Union Trust v. Southern (1882), Swann v. Clark (1883) and Union Trust Co. v. Illinois Midland (1885). Also plotted are the average annual citations to five sets of eight randomly selected comparable cases. These five comparable samples consist of eight cases each, with each of the eight cases matching the railroad receivership cases in year decided and venue. None of the comparable samples include any of the eight receivership cases. The mean number of citations to the five sets of eight cases is plotted.



Source: Lexis database of all federal court and Supreme Court cases from 1792 to 1991, in the Lexis GENFED library, OMNI file.

Figure 5

Diffusion of contingent charge securities in the late nineteenth and early twentieth centuries.

This table plots contingent charge securities (preferred stocks or income bonds) as a percentage of total capitalization of samples of railroads in the late nineteenth and early twentieth century. For each decade (1870, 1880, 1890, 1910), a sample of railroads which "failed" (defaulted on debt obligations and came under receivership) is identified. The darker shaded bars show, for each of these four samples, the percentage of contingent charge securities on these railroads' balance sheets prior to entering receivership ("beginning of period") and after leaving receivership ("end of period"). The usage of contingent charge securities by a "control" sample of railroads is shown for comparison by the lighter bars. For additional information on the sample selection, sample sizes, and definition of the control sample, see table 3.

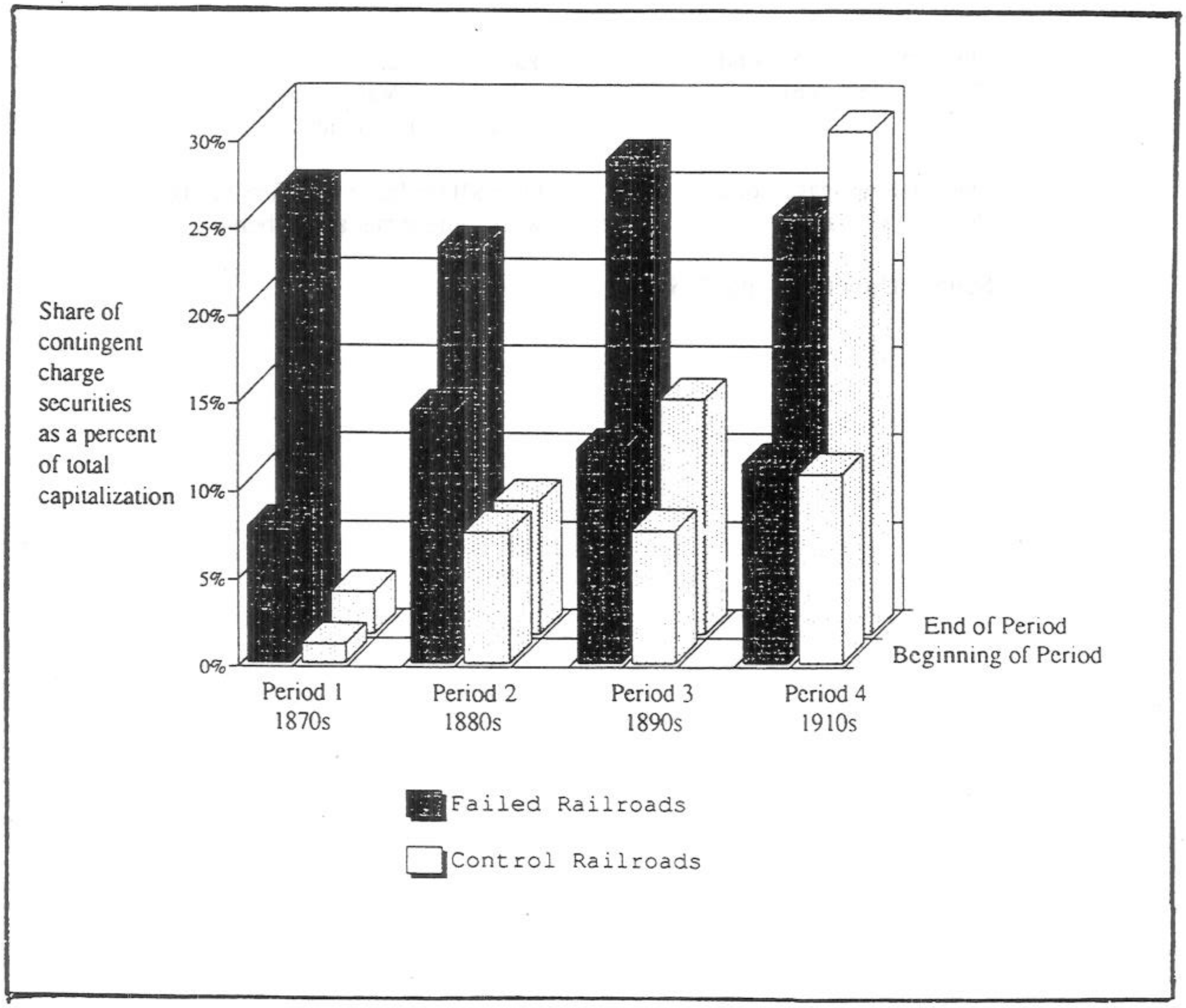


Table 1

A simplified, but representative, reorganization proposal from the 1890s.

In exchange for:	Old holder receives:
One old common share + $50 in cash (assessment)	$50 (face value) of 4% bonds + $75 (par value) in new firm's common stock.
One old preferred share + $50 in cash (assessment)	$50 (face value) of 4% bonds + $100 (par value) in new firm's common stock.
One old 5% junior bond ($1000 face value)	$500 (face value) 4% bond + $500 (par Value) in preferred stock with 6% dividend.
One first mortgage bond ($1000 face value)	One $1000 face value first mortgage bond with same terms as old bond.

Source: Lyon (1916, pp. 275-287)

Table 2

Selected Financial Innovations Popularized by Distressed Railroads

Innovation:	Diffusion of practice attributed to railroad reorganizations:
Preferred Stock	"Down to 1880, the vast majority of corporations...had merely one class of stock...When the railroads were reorganized in the middle 1890s, preferred shares were introduced as a means of giving junior bondholders a preference over common shareholders without giving them a fixed charge security." [Dewing (1934, p. 136)].
Income Bonds	"The frequent use of income bonds...did not occur until the time of the railroad reorganizations of 1884, nor did income bonds become common until after 1895, when they were used as an accepted expedient in refunding fixed charge securities of failed railroads. In fact, nearly a third as many income bonds as preferred stocks -- the acknowledged contingent charge security -- were issued as a result of railway reorganizations." [Dewing (1934, p. 318)].
Voting Trusts	"(I)t was not until the late eighties and during the decade of the nineties that the device was widely used. During this period there were numerous railroad reorganizations, many of which made use of the voting trust." [Leavitt (1941, p. 23)]
Bond Covenants	"Until the 1890s, this growth (in the development of bond indentures) was slow and erratic...The panic of 1893 and the ensuing depression resulted in many railroad failures and reorganizations. New mortgage trust indentures of the reorganized companies were based upon comprehensive studies of such instruments by many lawyers. These instruments established the form of corporate mortgages from which the modern voluminous indentures developed." [Rogers (1965, p. 554)].
Deferred interest obligations	"Since the ... late eighties, it has become the established practice to refund most, if not all, of the underlying and divisional issues into a single issue of first mortgage long-time bonds, bearing a low rate of interest and smaller, in principal, than the old underlying and divisional issues." [Dewing (1920, pp. 132,133)].

Table 3

The impact of financial distress on railroad capital structures, 1870s - 1910s.

The table shows the capital structures of U.S. railroads around four periods of severe financial distress in the period 1870 - 1920. For each of these periods, the table reports the composition of the capital structures (in book values) of railroads that defaulted on bonds and entered receivership ("failed" railroads) with the capital structures of a "control group" of railroads, at common calendar dates before and after the period of distress for the failed railroads. Securities are categorized as common stock, contingent charge securities (preferred stock and income bonds) and fixed charged securities. The samples are defined below.

Panel A: 1870s

Failed

Sample Description:
Two criteria were used in selecting railroads for this sample. (1) A railroad must have defaulted on more than $5,000,000 of bonds between Sep. 20, 1873 (the Panic of '73) and January, 1876. This information was available in "Railroads in Default," in the annual edition of the Commercial and Financial Chronicle (1876, pp. 16-20).
(2) A railroad must be reorganized before 1882. The source for this information was Poor's Manual of Railroads [Poor's] (1883). Together, these criteria yielded a group of 20 railroads. Five were dropped because they had merged with other railroads in the process of reorganization; this left 15 railroads in the final sample. Source of balance sheet data: Poor's (1873/4, 1883).

Year	N	Common Stock	Contingent Charge	Fixed Charge	Total
1872	15	40.5%	7.8%	51.7%	100%
1882	15	40.6%	25.3%	34.1%	100%

Control

Sample Description:
Fifteen railroads that did not become distressed from 1872-1882 are matched to the sample of failed railroads. Railroads were matched by three criteria: location, mileage and capitalization in 1872 (source: Poor's 1873/4). In most cases, matching railroads are in the same geographic area as the distressed road, and mileage and capitalization are within 20 percent of the distressed roads' mileage and capitalization. Source of balance sheet data Poor's (1873/4, 1883).

Year	N	Common Stock	Contingent Charge	Fixed Charge	Total
1872	15	65.9%	1.1%	33.0%	100%
1882	15	57.1%	2.4%	40.6%	100%

Panel B: 1880s

Failed

Sample Description:
Poor's (1900) contained an article, "A Study in Railway Statistics," that examined 57 leading railroads reorganized since 1884. The railroads in the study were divided into those reorganized before 1893 and those reorganized in 1893 or later. The 13 railroads reorganized before 1890 and not bought out in the process comprise the failed sample for this panel. Source of balance sheet data: Poor's (1881,1891).

Year	N	Common Stock	Contingent Charge	Fixed Charge	Total
1880	13	35.3%	14.4%	50.2%	100%
1890	13	36.7%	22.1%	41.2%	100%

Control

Sample Description:
The control group in this panel is all U.S. railroads. The 1880 data is from the "Report on the Agencies of Transportati[illegible] [illegible]e United States," in the Census of the United States (1880). 1890 data is from the Interstate Commerce Commission, Statistics of Railways in the United States [ICC Statistics] (1890).

Year	N	Common Stock	Contingent Charge	Fixed Charge	Total
1880	ALL	46.2%	7.5%	46.2%	100%
1890	ALL	42.6%	7.6%	49.8%	100%

Panel C: 1890s

Failed

Sample Description:
The sample is a subset of 57 distressed railroads examined in Poor's (1900). See description of sample in Panel B. Of the 57, 40 were reorganized after 1893 and before 1900, and were not bought out by other railroads in the process. Source of balance sheet data: Poor's (1891,1900)

Year	N	Common Stock	Contingent Charge	Fixed Charge	Total
1890	40	28.7%	12.2%	59.2%	100%
1900	40	31.2%	27.1%	41.7%	100%

Control

Sample Description:
The control group is all U.S. railroads. Source: ICC Statistics (1890, 1900).

Year	N	Common Stock	Contingent Charge	Fixed Charge	Total
1890	ALL	42.6%	7.6%	49.8%	100%
1900	ALL	39.6%	13.5%	46.9%	100%

Panel D: 1910s

Failed

Sample Description:
The sample is a study of 15 railroads operating 500 miles of line or more and reorganized between 1907 and 1917, by Dagget (1918, p. 473).

Year	N	Common Stock	Contingent Charge	Fixed Charge	Total
1907	15	24.3%	11.4%	64.3%	100%
1917	15	27.2%	23.9%	48.9%	100%

Control

Sample Description:
The control group is all U.S. railroads. Source: ICC Statistics (1908, 1918).

Year	N	Common Stock	Contingent Charge	Fixed Charge	Total
1907	ALL	36.9%	10.8%	50.3%	100%
1917	ALL	34.5%	28.8%	36.7%	100%

Table 4

Comparison of fixed charges (interest payments on indebedtnesses excluding income bonds) prior to and immediately following reorganization for 57 major railroads detailed in Poors (1900, p. lxxvi). These 57 railroads were reorganized in the period 1894 - 1899.

Fixed charges	Prior to Reorganization	Immediately Following Reorganization
Principal value	$1,190,395,367	$927,530,177
Total annual interest charges	$67,766,959	$43,757,272
Average interest charge	5.78%	4.72%
Average fixed charges per mile of railroad owned	$2225	$1437

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8
WHARTON REPROGRAPHICS

The Standard Oil Company—Combination, Consolidation, and Integration (Abridged) (A)

Introduction

An understanding of the history of Standard Oil Company—the parent of Exxon, Mobil, Marathon, Chevron, and other giant contemporary companies and famous brands—is essential to an understanding of the rise of the large corporation in the American economy. Modern large-scale business organizations first appeared in the operation of the major railroads in the 1850s. In the 1870s and 1880s, similar business organizations were formed in the industrial sector. While some companies grew large purely through internal expansion without acquisition, the more normal road to size in American manufacturing was the route Standard Oil took. That route involved horizontal combination, followed by legal and administrative consolidation, and then vertical integration.

This pattern of corporate growth became common during the last years of the nineteenth century. Occasionally, short-lived local cartels had been organized in the 1850s and 1860s, as the factory form of production spread over the nation. Then, during the severe economic depression of the 1870s, industrialists made a concerted effort to organize nationwide associations to control price and production. In those years, few industries escaped attempts at cartelization. Yet, as was true in the railroad world, cartels rarely worked very well for very long. This case suggests why they did not work in the early years of the oil industry, and the experience of oil was paralleled in many other industries.

The inadequacies of association or federation led to a search for new ways to provide legal control over a large number of individual enterprises. One was through the purchase of stock in competing companies or, more often, the exchange of stock between competing companies. More effective was the "trust," invented in 1881/1882 by the Standard Oil Company. This legal device made it possible for a single business unit to hold stock in a number of

Professor Alfred D. Chandler, Jr. prepared this case, based primarily on Harold F. Williamson and Arnold F. Daum, The American Petroleum Industry: The Age of Illumination, 1859-1899 (Evanston, Ill., 1959); supplemented by Ralph W. Hidy and Muriel E. Hidy, Pioneering in Big Business, 1882-1911 (New York, 1955); Allan Nevins, John D. Rockefeller: The Heroic Age of American Enterprise, 2 vols. (New York, 1940); Allan Nevins, Study in Power, John D. Rockefeller, Industrialist and Philanthropist, 2 vols. (New York, 1953); and Ida Tarbell, The History of the Standard Oil Company, 2 vols. (New York, 1904). It was prepared as a basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation. This is a revision of a case originally prepared by S.M. Salsbury, under the supervision of Professor A.M. Johnson. Professor Thomas K. McCraw abridged and revised the case further.

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companies in many different states. Even more effective was the holding company, which became the usual form of such control after 1889, when New Jersey passed a general incorporation law for holding companies.

Legal consolidation greatly facilitated administrative centralization. While some managers of the new trusts and holding companies were content to use them as a means to control price and production, others realized the possibility of rationalizing the production facilities under their control. Plants could be modernized and enlarged so as to exploit effectively the economies of scale permitted by the new industrial technology. Factories and refineries could be located so as to take the best advantage of markets and sources of raw materials.

Once production had been rationalized and economies of scale introduced, managers of the new large enterprises found themselves moving forward into wholesaling and occasionally retailing to assure themselves of direct access to markets and to profit from economies of scale in distribution. They also moved backward into production of semifinished and raw materials to assure themselves of a constant stock of supplies. The end result was the creation of the large, integrated, multifunctional, centrally-managed enterprise. It all represented an organizational revolution of vast significance for the future of business in the United States and indeed the entire world.

The early history of Standard Oil provides an excellent example of this process of corporate growth via combination, consolidation, and vertical integration, which so many other companies followed. A review of its story thus helps to identify the conditions, motives, and methods that led to the rise of the large modern corporation.

The Early Oil Industry

The oil industry grew from small beginnings. "Rock oil" had been found in Pennsylvania, Kentucky, Ohio, and West Virginia, and had been used in the early decades of the nineteenth century as a cure for an endless list of maladies. In the 1850s petroleum refiners, building on the technology of the coal oil and natural gas industries, discovered the potentialities of refined petroleum as an illuminant. In 1859 Edwin Drake's drilling success at Titusville, Pennsylvania resulted in a tumultuous rush to the oil fields of western Pennsylvania. Since little capital was required to enter the industry, many would-be millionaires flocked to the oil fields. Farmers became rich overnight, and boomtowns materialized.

Within ten years after Drake's well opened the new era, the oil industry had grown to great importance. Annual production of crude oil rose from 2,000 barrels in 1859 to 4,800,000 in 1869 and 5,250,000 in 1871. By 1880 oil was the nation's fourth largest export. The basis of this rapid growth lay in the demand of the consuming public for improved illuminants[1] and industrial requirements for more and better lubricants.

In the initial period, a few thousand dollars invested in drilling a well could yield millions, but a gusher that made people wealthy might also dry up suddenly. With minimal capital

1. It should be stressed that during the whole of the nineteenth century, kerosene for lamps was by far the single most important product of the oil industry.

requirements, high incentive, and ease of entry, something approaching pure competition existed in the producing end of the business. Output was completely unrestrained, failures numerous, and speculation rampant.

Conservation of oil resources simply did not exist. Under the "Rule of Capture,"[2] a well owner could extract as much oil as possible from his own well regardless of the effect on the oil pool below or the wells of others. This legal sanction encouraged reckless exploitation of the resource.

Instability, therefore, characterized the refining industry. It suffered not only from internal cutthroat competition, but from the uncertainties of crude oil production. Both the price and supply of oil fluctuated wildly. In 1862 the monthly price per barrel of crude oil ranged between $0.10 and $2.25; in 1864 between $4.00 and $12.13; and in 1871 between $3.83 and $4.83.

These fluctuations in price and supply were, to some extent, mitigated by ever-increasing markets at home and abroad. Until the mid-1880s, the United States provided most of the world's crude and refined petroleum. It was only after that time that competition from Russia and the Dutch East Indies became significant. Throughout the nineteenth century, the major market for American refiners remained Europe, which, until 1890, took two-thirds of their output.[3]

Business organizations in the oil industry initially took the form of partnerships, but corporations became more frequent as capital requirements increased. In the early days of the industry, the functions of drilling, producing, transporting, marketing, and refining were in separate hands. Refiners often produced only one type of product, such as kerosene, naphtha, or lubricants. Under the impact of competition, however, firms engaged in one operation often attempted to add others. Several efforts at building a variety of combinations both vertical and horizontal were made (usually by means of interlocking partnerships prior to the creation of the Standard Oil group). Nevertheless, most business units in the young oil industry were small and acted individually. As a result, voluntary efforts at cooperation by such means as informal agreements fell apart under the pressures of competition.

Transportation had an important place in the industry from its earliest days. Petroleum deposits were found far from existing population and export centers, and the physical problems of moving petroleum were a major challenge. Gradually this problem was solved. Small diameter pipelines, called gathering lines, collected oil in the fields and delivered it to railheads whence it was moved to refineries in barrels and, later, tank cars. The rates charged for these services remained an extremely controversial issue long after the physical difficulties of transportation had been overcome.

Under these conditions, the location of refineries with respect to transportation as well as to the market frequently proved to be an important determinant of success. A refinery dependent on one railroad was not in nearly as good a competitive position as one which could choose among several railroads. The railroads themselves were intensely competitive, and large

2. The "Rule of Capture," with roots in an English case (*Acton v. Blundell*, 1843), held that the owner of the soil also owned all that was beneath it. Since oil is fugacious in character, the application of this rule encouraged competitive drilling as the only means of protecting a producer against his neighbors.

3. See tables in Williamson and Daum, *American Petroleum Industry*, pp. 332, 335, 489, 492, and 660.

refiners could not only take advantage of rate wars but also could demand special concessions and rebates in return for using a particular line.

The petroleum industry as it emerged in the post-Civil War period was thus characterized by numerous small firms competing fiercely in an atmosphere of "anything goes." A wildly fluctuating market, whose unpredictability was based on perennial imbalance between supply and demand, caused both producers and refiners to seek some way of stabilizing their positions. It was John D. Rockefeller and his associates who successfully analyzed and manipulated this complex situation in order to control the competitive climate of the whole industry.

Rockefeller and the Beginnings of Standard Oil

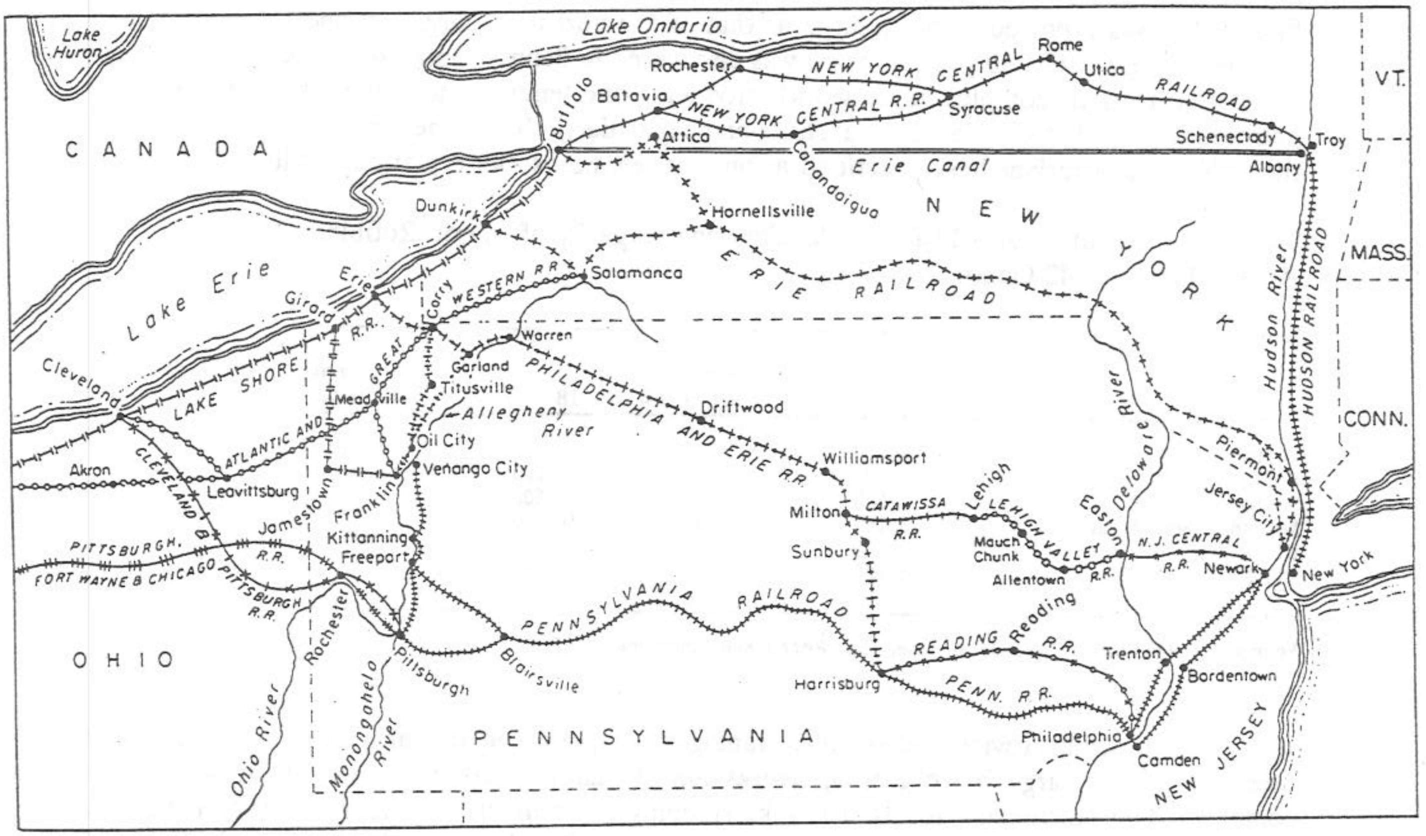
John D. Rockefeller, whose name is almost synonymous with the development of the petroleum industry and the rise of large-scale enterprise, entered the oil business almost by chance. Born in 1839, he grew up in an unexceptional household where he was imbued not only with the values of thrift and industry but also with religious piety. He remained a devout Baptist throughout his life. After graduation from high school, he became a bookkeeper in a Cleveland produce commission firm. Three years later, in 1859, at the age of 19, he formed his own wholesale grocery business together with Maurice B. Clark. Each partner initially contributed $2,000. About $900 of Rockefeller's share was derived from savings; the remainder he received from his father. The firm of produce merchants did very well, especially during the Civil War, when the price of commodities rose sharply.

In 1862, Clark was approached by Samuel Andrews, an old friend and a self-taught chemist, who was seeking help in financing an oil refinery. Though he considered oil only a "side issue," Rockefeller agreed to join; and in 1863 a new partnership, Andrews, Clark & Company was formed. The refinery began operation under the name of the Excelsior Works. Refining methods were continually improved under the direction of Andrews, and by 1865 the plant was the largest in Cleveland.

The major Midwestern refining centers were Pittsburgh and Cleveland. In the competitive struggle between the two centers, Cleveland had several advantages. Even though it lay to the west of Pittsburgh, and thus further from Atlantic export terminals, it had access to both railroad and water transportation—the Great Lakes for western shipments and the New York canal system for eastern deliveries. In addition, Cleveland shippers also had a choice of three railroads rather than being entirely dependent on one, as Pittsburgh was at that time. (See **Figure A** on opposite page.)

In 1865, Rockefeller gave up the produce commission business and began to devote his full efforts to refining. He bought out Clark for $72,000, and the firm continued under the name of Rockefeller and Andrews. The latter was in charge of technical operations. In 1867 William Rockefeller, John's brother, went to New York to handle the firm's eastern business and its growing foreign trade. That same year the firm added two important partners, Henry M. Flagler and Stephen V. Harkness. Flagler, who like Rockefeller had obtained his business experience as a commission merchant, took an active role in management. Harkness, who was an uncle of Flagler's wife, had accumulated capital in distilling whiskey. He also invested in the enterprise,

Figure A Trunk Line Connections with the Region, 1864.



Source: Williamson and Daum, *American Petroleum Industry*, p. 299.

but did not participate in its management. Together they contributed approximately $110,000 to $140,000. In 1869, the various Rockefeller partnerships were consolidated, and in the following year the partnerships were replaced by a corporation.

The Standard Oil Company (Ohio) was capitalized at $1,000,000. Of the 10,000 shares issued, John D. Rockefeller received 2,667; S.V. Harkness 1,334; H.M. Flagler, Samuel Andrews, and William Rockefeller 1,333 each, and the Rockefeller, Andrews and Flagler partnership 1,000. Nine-tenths of the shares were thus held by one silent and four active partners who had previously been concerned with the business. John D. Rockefeller was president, and two of the others were officers. All five of these individuals would become fabulously wealthy over the next two decades.

The years between 1866 and 1869—the critical years for the Rockefeller venture—were ones of rapid growth and expansion. In 1865 the existing refinery was the largest in Cleveland and possibly the largest in the world. Early the next year William Rockefeller set up a sales office in New York to handle the marketing of kerosene, particularly for the all-important export trade.

In the same year a second refinery was completed in Cleveland. Between 1866 and 1869 the daily throughput of that refinery complex rose from 500 barrels to 1,500 barrels a day.[4] As of September 30, 1869, the partnership's gross receipts for the previous year were $2,433,689, a figure that was reported to be as large as that of the next three largest refineries in Cleveland combined.[5] By 1869, ten years after oil was discovered in Pennsylvania, the Cleveland works was the largest refining complex in the world, producing one-tenth of the nation's output of refined petroleum (See **Table A** for regional shifts and capacities.). It was the first works to reach what the industry's historians have described as an "entirely new scale in plant and still size."[6]

Table A Location and Daily Crude Charging Capacity of Major Refining Areas: 1864-73 (42-Gallon Barrels)

	1864–65	Per cent of Total	1872–73	Per cent of Total
Pittsburgh	4,500	39%	10,000	21%
Philadelphia	600	5	2,000	4
Boston	500	4	600	1
New York-New Jersey	3,100	26	10,000	21
Cleveland	800	6	12,500	26
Oil Region	2,160	19	9,200	20

Source: Williamson and Daum, *American Petroleum Industry*, p. 291.

Such scale provided powerful advantages. It permitted the firm to integrate ancillary operations.[7] A large barrel-making works and a sulfuric acid plant were built within the complex. The partnership invested in lake shipping and built storage depots in the oil regions as well as tank cars to carry crude from the regions to Cleveland. It also purchased wharfage, warehouses, and lighters in New York Harbor. Scale also permitted a sizable output of by-products, particularly lubricants. Most important of all, the new scale of operations greatly reduced the cost of producing a gallon of kerosene. While unit costs for a refinery with 500-barrel daily throughput was around 6¢ a gallon, those in the refinery with 1,500-barrel throughput dropped to 3¢ a gallon and probably less.[8] This relationship of scale to costs has remained central to the structure of the oil industry from that date to this. Because Rockefeller's Cleveland refinery complex had become the largest in the industry, it also became its low-cost producer.

Scale provided still more advantages. It facilitated access to short-term loans from commercial banks to cover operating expenses, for the Cleveland bankers were fully aware of Rockefeller's prosperity.[9] Increased profits resulting from sharply reduced costs provided capital

4. Nevins, *Rockefeller*, I, p. 59. The daily charging capacity may have been larger. Rockefeller's estimate for 1869 is for barrels of oil refined, while the company bankers' estimate in their correspondence was 3,000 barrels of crude capacity. Nevins, *Rockefeller*, I, p., 75.
5. Nevins, *Rockefeller*, I, p. 74.
6. Williamson and Daum, *American Petroleum Industry*, p. 273. On pp. 279-286 the authors review the operation and cost of refineries operating at this scale.
7. Nevins, *Rockefeller*, I, pp. 40-41, 59, 71-74.
8. Williamson and Daum, *American Petroleum Industry*, pp. 228-230, 283-285, 428-483. As the authors stress, cost data in the early years were rough, but economies of scale were real.
9. Nevins, *Rockefeller*, I, pp. 74-75.

for further expansion in refining and ancillary operations. Finally, the high volume of output gave Rockefeller and Flagler far greater leverage with the railroads, particularly those that transported refined oil east, than their small competitors could match. Although other Cleveland refiners received concessions from the railroads, obviously Rockefeller's trade was the account that railroad traffic managers most cherished. As in many other American industries in the post-Civil War era, railroad competition increased the large shipper's leverage. The intense pressure of their very high fixed costs led railroad managers to grant rebates and other favors in return for guaranteed shipments. Since transportation costs formed a significant part of the total cost of refined products, these railroad practices greatly benefitted refiners and other shippers in a position to exploit them.

In 1868, the Rockefeller partnership and two other Cleveland refiners (Clark, Payne and Company and Westlake, Hutchins & Company) attempted to gain additional advantages by acquiring a one-fourth interest in a gathering pipeline company which possessed an exclusive contract to deliver crude oil to the Atlantic and Great Western Railroad, a subsidiary of the Erie Railroad. The pipeline was receiving drawbacks from the railroad, and the three refiners contracted with the company to receive a portion of those drawbacks. They also received, as a result of their interest in the company, a quarter share of drawbacks received from the shipments of other firms' oil. By playing railroad against railroad, railroads against water transport, and, later, pipeline against pipeline, Standard Oil strengthened its position in the industry.

The Conquest of Cleveland

Once their enterprise had been incorporated as the Standard Oil Company, Rockefeller, Flagler and Harkness began a concerted effort to dominate oil refining in Cleveland. Their strategy was to obtain still more favorable rates from the railroads by taking advantage of their large throughput. Sometime in 1870 Flagler proposed to James H. Devereux, the general manager of the Lake Shore Railroad (which had just become a subsidiary of the New York Central) to ship 60 carloads of oil a day, every day, if the Lake Shore and the Central would give his company a rate of $1.30 a barrel from Cleveland to New York (the published rate was $2.00 a barrel) and 35¢ a barrel for crude from the Regions to Cleveland.[10] Devereux quickly accepted. As he later testified, the assured regular flow permitted him to run a single train daily made up wholly of oil cars instead of putting oil cars on trains containing a mix of other types of freight cars. The improvement in scheduling meant that fewer cars were needed. The resulting lower investment and maintenance costs and the small cost of providing a locomotive and crew for the daily trip meant that the railroad could still make a good profit on the reduced rate. Of course, Devereux knew that if he refused, Flagler could certainly get the same deal from the Erie. When, after hearing of the rate cut, other Cleveland refiners protested, Devereux claimed these rates were not inequitable because "this arrangement was at all times open to any and all parties who would secure or guarantee the like amount of traffic or an amount to be treated and handled in the same speedy and economical manner. . . ."

Armed with this new contract, Flagler and Rockefeller first invited their two major competitors (Clark, Payne & Company and Westlake, Hutchins & Company) to join forces—an

10. Affidavit of James H. Devereux in the case of *Standard Oil Company v. William C. Schofield, et al.*, quoted in Tarbell, *History of the Standard Oil Company*, I, pp. 277-279.

invitation the two readily accepted. Then Standard Oil approached the other Cleveland refiners. By the end of 1871, Standard had obtained control of five large and seven small firms, and the conquest of Cleveland was practically complete. At the same time, to strengthen their position in the all-important foreign market, the Standard partners acquired Jabez A. Bostwick & Company of New York, a leading export firm with a refinery on Long Island. In Cleveland the larger and more efficient works continued to operate under Standard's control, although the change in command was kept secret. Competent refiners such as Payne and Bostwick became senior executives of Standard Oil. On the other hand, smaller refineries not producing specialized products were closed down and their owners had to find a new business. By 1872, Standard's power in Cleveland gave it control over one-quarter of the total daily capacity of the entire industry.[11]

In buying out their Cleveland competitors, Rockefeller and his associates preferred to pay through an exchange of stock rather than in cash. Not only was this method cheaper for Standard Oil, it permitted competitors who made the exchange to profit from Standard's growth. Many became very wealthy as the value of their Standard shares sharply increased. Whatever the form of payment, Standard Oil appraisers determined the value of the properties purchased. Inevitably the buyer and seller had different views. The seller thought in terms of the cost of their works, and the buyer in terms of "use-value" of the plant and equipment to Standard Oil. But most of the sellers felt that they had little choice in the matter. Frank Rockefeller, who had joined one of his brother's competitors, remembers that John had threatened: "If you don't sell your property, it will be valueless because we have advantages of the railroads."[12] Another refiner who did not want to sell, Robert Hanna of a leading Cleveland industrial family, reported that Rockefeller told him, "You can never make money in my judgment. You can't compete with Standard. We have all the large refineries now. If you refuse to sell, it will end in your being crushed."

Late in 1871, as the conquest of Cleveland was drawing to a close, the Standard Oil Company was one of several oil refiners invited by Tom Scott, the vice president in charge of external affairs for the Pennsylvania Railroad, to take part in a railroad pool for oil shipments. The instrument through which the pool was to be carried out was the South Improvement Company, which Scott had had incorporated by the Pennsylvania Legislature. The proposal was to have the South Improvement Company act as an "evener of oil shipments from the interior to the port cities." This meant that the company would administer the allocation of quotas in the oil traffic pool and receive, as a commission, rebates and drawbacks on the shipments. Railroad freight rates were to be increased and stabilized. This move would benefit the railroads. Nonmembers of the South Improvement Company would be charged the full published rates while members would receive rebates. The huge differential between the rates of members and nonmembers in itself would probably have eliminated nonmembers from effective competition, but in addition to the rebates, members were to receive payments (drawbacks in the form of commissions) on all petroleum shipped by nonmembers. The major share of this money, which it was hopefully estimated would be between $5 and $6 million annually, was to be used to "kill any attempt by rival railroad managers, producers, refiners, speculators, or foreign export agents to break down the contract" between the refiners and the railroads.[13] To give even further advantage to members, the railroads agreed to provide the South Improvement Company with

11. Williamson and Daum, *American Petroleum Industry*, p. 353.
12. This and the following quotation are from Tarbell, *History of the Standard Oil Company*, I, pp. 64, 66-67.
13. Williamson and Daum, *American Petroleum Industry*, pp. 349-350.

daily reports on all oil shipments, thus giving members inside information on their competitors' business.

The South Improvement Company issued 2,000 shares, of which two large Pennsylvania oil brokers were each to have a 23.5 percent interest and the Rockefeller group a 45 percent block. Although it is probable that all refiners were to be invited to join, there was some disagreement regarding the terms on which producers of crude oil would be accepted. It was hoped that producers would agree to limit production of crude oil in return for a guaranteed minimum price. Before this matter could be settled, however, news of the proposal leaked out.

The reaction was a devastating public scandal. Although the South Improvement Company never handled a barrel of oil, angry producers and those refiners who had not been asked to join sought to curb shipments of crude oil to members of the South Improvement Company and conducted a public campaign with the purpose of revoking its charter. Both efforts were effective. The amount of crude oil shipped to the offending refiners dropped sharply. The railroads capitulated first, promising to avoid interference in the relations of producers and refiners and canceling their contracts with the South Improvement Company. Public opinion sided generally with the producers. Although the "Oil War" ceased when Pennsylvania revoked the company's charter, a legacy of suspicion remained.

The South Improvement episode affected the Standard Oil Company in two quite different ways. It was during the furor over the project that knowledge of Standard's conquest of Cleveland, which had been largely carried out in secret, became publicly known. In fact, many oil men believed Rockefeller had used the threat of the South Improvement project to bring the Cleveland companies into line. In subsequent public muckraking attacks on Standard Oil, the memory of that scheme was often revived, even decades later. The South Improvement proposal also turned Rockefeller and his associates to thinking about stability and control of the refining industry for the nation as a whole. Scott's proposal had aimed at assuring control of all refining output, not just that of one city or region. The senior executives at Standard had decided to try to bring stability to price and output through voluntary methods. But if these failed, then control of output through control of railroad transportation, as Scott had proposed, remained an attractive alternative.

Voluntary Association as a Means of Stabilization

Control of price and production in the oil industry had been first proposed in 1869 when the producers of crude oil formed their Petroleum Producers Association. Yet that organization achieved little and by 1872 was defunct. It came to life again, however, when in August 1872, shortly after the collapse of the South Improvement scheme, the refiners formed their National Refiners Association. John D. Rockefeller was named president. Each of the five major refining areas (New York, Philadelphia, Pittsburgh, the Oil Regions, and Cleveland) elected three representatives to a 15-person board of directors which became responsible for general policies. A small permanent board made up of one representative from each district was to carry out the policies set by the board as to the buying of crude oil, the allocation of refining quotas, the setting of prices, and the securing of uniform railroad rates for all members. Profits were to be distributed to members on the basis of the value of their properties. Members promised to keep their specific agreements secret. Yet the new association failed to develop any sanctions to enforce its decisions, and not all refiners joined.

The Refiners Association's first move was to negotiate a contract with the revived Producers Association. The producers formed a company to purchase at a set price all oil pumped by its members and then sell it to the refiners. Rockefeller, as president of the refiners association, agreed to buy at that price. On December 19, 1872, the two groups signed the "Treaty of Titusville." The price of crude was set at $4.00 a barrel, if a gallon of refined sold in New York City at 26¢ a gallon. If the price of refined increased 1¢ a gallon, the price of crude would go up 25¢ a barrel until it reached $5.00. But, as might have been expected, breakdowns and defections soon developed. The producers simply were unable to prevent increased output and new drilling, and the price of crude dropped again. It soon became apparent that the agreement between the groups could not be fulfilled, and the contract between them was canceled.

Nevertheless, the refiners association still attempted to set quotas and divide territories. As a goad for compliance, it added fines for violations. Despite these additional efforts, the group's goal was not achieved. Enforcement proved impossible, nonmember refiners increased output, and prices fell. Within a year of its formation, the association was dissolved. As Rockefeller himself put it long afterward, "We proved that producers and refiners associations were ropes of sand."[14]

Failure to achieve stabilization resulted in further overproduction. The amount of crude produced rose rapidly while the prices of both crude and refined products dropped sharply. Output of crude per day rose from 21,000 barrels in 1872 to 33,000 barrels in 1873. The price dropped from $3.75 per barrel in 1872 to $1.80 in 1873.[15] Although the demand for petroleum products continued to grow, it did not keep up with supply. Excess capacity developed. Failures and bankruptcies were frequent.

The Creation of a National Monopoly

During much of 1872 and early 1873, before the ineffectiveness of the refiners association became clear, Rockefeller and his senior executives concentrated on rationalizing their recently acquired facilities in Cleveland. They consolidated, reorganized, and improved their larger refineries and developed units to handle by-products and auxiliary activities, such as acid restoration, tar manufacture, and lubricating oil. To help assure markets for their increased production, they acquired the Devoe Manufacturing Company, another major exporter with a large refinery on Long Island; and an interest in Chess, Carley & Company, the leading wholesaler in the southeastern United States. By the end of 1873 Standard Oil's expanded Cleveland output and that of its New York refineries accounted for more than a third of all the oil refined in the United States. (Before the conquest of Cleveland, Standard's output was about 10%.) Yet, in that year, Standard's refineries were operating at only two-thirds capacity

With the collapse of the National Refiners Association, Rockefeller and his associates decided early in 1874 to bring a large part of the industry directly under Standard's legal control. They proposed to do this by obtaining, preferably through an exchange of stock, a controlling or at least a large minority share of the stock in major companies in the other refining areas besides

14. Nevins, *John D. Rockefeller: The Heroic Age of American Enterprise*, I, p. 431.
15. Williamson and Daum, *American Petroleum Industry*, p. 359.

Cleveland. Such control would permit Standard to have a say in setting the price and output of refined petroleum throughout the country. The grinding economic depression that had begun the year before helped to precipitate this plan.

As he had done in Cleveland, Rockefeller decided to use control over transportation and shipping facilities as Standard's primary weapon. In 1872, by obtaining Bostwick, Standard had acquired the lease that firm had of the New York Central's oil terminal and shipping areas in New York. Then, in 1874, Standard leased similar facilities owned by the Erie. This meant that all competitors shipping through New York on the two northern trunklines had to use facilities owned by Standard Oil. In 1874, too, the railroads formed a new oil pool, which equalized all rates from the interior to the seaboard. That is, the rates from Cleveland to New York and Philadelphia were the same as those from Pittsburgh and the Regions, even though the distance from Cleveland was a good deal further. Early in 1875, the three trunklines carrying oil also agreed to give Standard and its allies a special extra 10% rebate in return for acting as the "evener" of the traffic. In 1874 and 1875 the gathering pipelines that brought oil to the railroad shipping points worked out comparable pools. Because Standard had increased its holdings in pipelines, its voice was the most powerful in defining these pooling arrangements.

Standard's executives then used these agreements, as they had used earlier ones in Cleveland, to persuade the largest and most efficient refiners to join them. They were careful to offer generous terms in the exchange of stock. In October 1874, the largest refining company in each of three major areas—Philadelphia, Pittsburgh, and New York—entered the Standard Oil alliance through an exchange of stock. With them came some of the most competent executives in the industry.[16] Then, in the first months of 1875, the biggest refinery in Parkersburg, West Virginia and the largest in the Regions also joined the group. These moves were to be kept secret. Each firm was to continue operation under its existing name and to buy up other refiners when the chance appeared.

The Standard Oil combination then revived the old association, naming it the Central Refiners Association. Rockefeller was again named president. But this time, there was a real difference. Because Standard Oil controlled the major refineries in the different areas, it controlled a majority of votes on the association's board. The new organization's purpose, as before, was to control all purchases of crude and sales of refined, to make rate agreements with the railroads and pipelines, and to divide profits among its members. To enforce its decisions effectively, the association proposed that each refiner lease its plant to the association, which would then negotiate transportation contracts for all members. The plan ultimately failed when Pittsburgh refiners, supported by the Pennsylvania Railroad, refused to join.

From then on, members of the Standard Oil combination decided not to work through any associations. Rather it would rely wholly on its own sheer economic power. That power derived from scale economies and from power leverage over transportation. Standard ruthlessly wielded its power to obtain control in those firms it wanted, through an exchange of stock; and drove those it felt it did not need out of the oil business. The strategy was effective. By the end

16. These included William Warden of the Atlantic Refining Company of Philadelphia; Charles Lockhart, R.J. Waring and William Frew of Lockhart, Frew & Company of Pittsburgh; Charles Pratt and H.H. Rodgers of Charles Pratt & Company of Newtown, New York; J.N. Camden of Camden Consolidated of Parkersburg; and John D. Archbold, the general manager of Porter, Morehouse & Company of Titusville. The last, who was long an implacable foe of Standard Oil, became one of the alliance's most influential executives.

of 1878, the Standard Oil combination controlled over 90% of total refining capacity in the United States.

Challenges to the Standard Oil Combination

As it was achieving its monopoly, Standard Oil faced two vigorous challenges, one from the Pennsylvania Railroad, the largest and most powerful corporation in the United States; the other from a combination of producers. Both challengers planned to break the Standard alliance's control over long-distance transportation of crude oil. One failed; the other was at least partially successful.

After negotiations for the 1875 pool, the Pennsylvania Railroad became increasingly troubled by Standard's power. Standard already controlled the oil traffic on the two New York trunk lines. The Pennsylvania had to rely largely on independents for shipments. If Standard was not held in check, it could soon dictate to the Pennsylvania the terms of doing business. So in 1876, the railroad supported the proposal of its subsidiary, the Empire Transportation Company (a "fast freight" line that handled the road's oil shipments) to build refineries and to contract extensively for crude to be processed at these new works.

Standard Oil quickly struck back. It withdrew all shipments from the Pennsylvania and cut the price of refined. By mid-1877, some directors and executives of the Pennsylvania began to question the wisdom of the battle. And the road had other pressing problems in this time of continued economic depression. In July came a widespread labor strike of unprecedented violence following a general reduction of wages on the road. Burning and rioting resulted in more than $2 million worth of damages. Reeling from this blow, the Pennsylvania decided to give up the fight with Standard. It dissolved the Empire Transportation Company, selling its pipelines and refineries to the Standard alliance; and it meekly accepted the terms of the new pooling arrangements by which Standard received a rebate on all shipments, including those of its competitors, as payment for acting as the eveners for the railroads.

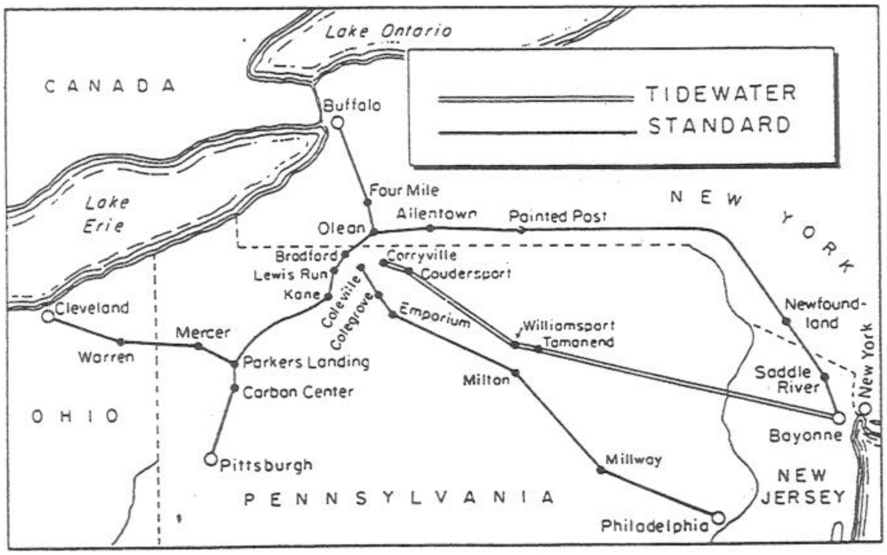
In September 1877, a few weeks after the Pennsylvania Railroad had capitulated to the Standard combination, the independent oil producers once again organized. Their new association, the Producers Union, began an attack on Standard on three fronts. It proposed a shutdown of all wells in the Region in the hope of getting higher prices for crude. It put pressure on the Pennsylvania legislature and the U.S. Congress to outlaw railroad rate discrimination. And it organized a company to build a pipeline across the Allegheny mountains to Tidewater (i.e., the East Coast).

Only the last had a measure of success. In November 1878, the Tidewater Pipeline Company Ltd. was incorporated to construct a line from the Bradford fields to the Reading Railroad at Williamsport. Despite a drumfire of legal harassment by the Standard alliance to prevent Tidewater from acquiring its right-of-way, this first long-distance pipeline was completed in May 1879. Tidewater was soon selling its daily delivery capacity of 6,000 barrels to independent refiners in Bayonne, Philadelphia, and Williamsport. In time, it was delivering still

larger amounts to its own refinery in Bayonne which, by 1900, had become the largest refinery in the world.[17]

Predictably, Standard responded with alacrity, for Tidewater had done more than break the combination's grip on the transportation of petroleum from the interior to the seaboard. It had demonstrated that pipelines could carry crude oil over long distances at a far lower cost and in much greater volume than could the railroads. Standard immediately embarked on a major program to build a network of long-distance pipelines that would connect all its refineries to the producing Regions. In 1881, these new long-distance lines of the oil combination were consolidated in a new enterprise, the National Transit Company. That firm, in turn, took over the stock of the United Pipelines Company, which operated the combination's gathering lines. While building its network, Standard supported the trunk lines in a rate war with Tidewater and the Reading Railroad. The roads quickly found the battle exceedingly costly. Early in 1880, they made an agreement on rates and traffic that would keep the pipeline operating at close to full capacity. Then in 1883, as Standard's long-distance pipeline network was being completed, Tidewater and National Transit further stabilized rates by dividing oil transportation from the Regions east at a ratio of 88½% for National Transit and 11½% for Tidewater Pipeline Company. (See **Figure B.**)

Figure B Standard Oil and Tidewater Pipelines, 1884



Source: Williamson and Daum, *American Petroleum Industry*, p. 444.

While it was meeting the challenges from Tidewater and the Pennsylvania, the Standard Oil combination continued to expand its holdings and membership by lease or exchange of stock. Such lubricating oil and specialty firms as Vacuum Oil Company, the Chesebrough Manufacturing Company, and the Eclipse Lubricating Oil Company, Limited, joined the combination in those

17. Williamson and Daum, *American Petroleum Industry*, pp. 443, 465; John Moody ed., *Moody's Manual of Industrial and Miscellaneous Securities for 1900* (New York, 1900), p. 1011.

years. Minority interest was acquired in the marketing firms of Waters-Pierce Oil Company of St. Louis and the Consolidated Tank Line Company of Cincinnati. In Pittsburgh, Philadelphia, Baltimore, the Oil Regions, and New England, the Standard Oil group enlarged or consolidated its position.

Nevertheless, the number of independent refineries increased rapidly after 1878. The declining costs of chemical ingredients used in refining contributed to this increase, but perhaps even more important were the opening of huge new oil fields at Bradford, Pennsylvania, and the development of by-products—especially lubricants. The manufacture of lubricating oils, for which there was a growing demand, offered a particularly good opportunity to independents, which could develop specialized products for specialized markets. The Standard Oil combination did not keep pace with this development because its executives preferred to complete their pipeline network and reorganize refineries rather than launch immediately into by-products.

Organizationally, the Standard Oil alliance remained a loose federation of legally independent companies. Although Rockefeller and his close associates provided some central direction for the alliance, the group remained strategically vulnerable to several different kinds of challenges. Rockefeller and other top Standard executives mulled over what form these challenges might take, and how well Standard was equipped to handle them.

Exhibit 1 Chronology

1859	Rockefeller & Clark formed
1865	Rockefeller & Andrews formed
1867	Rockefeller, Andrews & Flagler formed
1870	Standard Oil Company formed
1870-1872	The Conquest of Cleveland
1871-1872	South Improvement Company project
1872-August	National Refiners' Association formed
1872-December 19	Treaty of Titusville
1874-1876	Standard Oil Company alliance drives toward monopoly
1876-1877	Challenge by Empire Transportation Co.

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WHARTON REPROGRAPHICS

J. P. Morgan, 1837-1913 (Abridged)

At the beginning of the twentieth century J. Pierpont Morgan was perhaps the most powerful person in the American economy. He controlled or had a say in the operations of a large share of America's railroad network. He had just played a major role in reorganizing the American iron and steel, electrical manufacturing, and farm implement industries. The federal government had looked to him for help in the financial crises of 1895 and 1907.

John Pierpont Morgan was born into a well-to-do and influential business family. His father, Junius Spencer Morgan (1813-1890), trained in mercantile-banking houses in Boston and New York before joining a wholesale dry goods firm in Connecticut. In 1851, he moved his family to Boston and joined that city's largest wholesale dry goods house—which was renamed J. M. Beebe, Morgan & Co.[1] In 1854, J. S. Morgan resigned from the Boston dry goods firm to accept a partnership in George Peabody & Co., merchant-bankers of London. Peabody (1795-1869) was a New Englander who had moved to London in 1837 and had become a major force in Anglo-American trade and finance. His firm of merchant-bankers dealt in foreign exchange and credits, bought and sold commodities and merchandise on both commission and its own account, and actively dealt in government and corporate securities on its own and joint account. By 1854, Peabody & Co. was supplying short-term capital to American railroads and was offering, on commission, their securities on the London money market. Net income of the firm from these activities stood at £58,081 for the year ending September 30, 1854.

J. S. Morgan was admitted to a 28% share in Peabody & Co. on October 1, 1854 and brought his family with him to London. Young Pierpont was fresh from graduating near the top of his class at Boston's English High as well as from a Grand Tour of Europe. For him, the move meant the finest schools in Switzerland and Germany. At Institut Sillig (1854-1856) and at the University of Göttingen (1856-1857), he studied European history, languages, and literature, chemistry, and mathematics, in which he excelled.

This case was written by Professor James P. Baughman, revised and updated by Professor Richard S. Tedlow, and revised and abridged by Professor Thomas K McCraw as the basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation.

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1. Among Beebe, Morgan & Co.'s junior partners was Levi P. Morton, who later founded the investment banking houses of Morton, Bliss & Co., New York and Morton, Rose & Co., London and who served as a Congressman from New York (1879-1881), U.S. Minister to France (1881-1885), Vice President of the U.S. (1889-1893), and Governor of New York (1895-1897). The Morgans and the Mortons were life-long friends.

Morgan Enters Business in New York

Autumn of 1857 found Pierpont "placed" by his father in the office of Duncan, Sherman & Co., American correspondents of Peabody & Co. Morgan was sent in 1859 to Cuba and Louisiana by his firm to learn sugar and cotton brokerage, but near the end of 1860, he returned to New York and opened his own office. Morgan's work was to collect for the account of his father's firm and to invest for its English clients, but he also traded in foreign exchange on his own and joint account.

Pierpont was soon prominent in the social whirl of Manhattan. He looked up his father's old partners Morris Ketchum and Levi P. Morton, now wealthy and respected New York bankers, and often turned to them for advice and endorsement. In 1861, Pierpont married Amelia Sturges, the younger daughter of a founding director of the Illinois Central Railroad. Tragically, Amelia suffered from tuberculosis and died on their honeymoon abroad. Morgan plunged again into business and on September 1, 1862, joined his cousin Jim Goodwin in a partnership styled "J. Pierpont Morgan & Co., Bankers." The two young men roomed together until Morgan's marriage in 1865 to Frances Tracy, the daughter of a leading commercial attorney.

Morgan's initial response to the Civil War was typical of many young men of affairs. He paid $300 for a "substitute" to serve in the Union army in his stead. This left him free to immerse himself in the opportunities of the wartime money market. His son-in-law later recalled:

> His firm bought and sold securities, bills of exchange, acceptances drawn against bills of lading, and staple products such as grain, dry goods, and British iron. They were building up a business in foreign exchange, and of course dealing in gold, the most active of all commodities dealt in during the war. He kept himself well informed about the prices current and the trend of the American markets and above all acted as a source of accurate, confidential, detailed information as to events on this side of the water for his father, who had now succeeded to the business of George Peabody & Company. On October 1 (1864), that firm's name was changed to J. S. Morgan & Company.

Morgan himself characterized these days in a letter to his father on September 19, 1862:

> The wear and tear upon me does not arise from deficiency in help the fault is with myself and myself only. It is my nature and I cannot help it. When I have responsibilities laid upon me I cannot throw it upon anyone else however competent the party may be. I am never satisfied unless I either do everything myself or personally superintend everything done even to an entry in the books. This I cannot help. My habit since I have been in business has been so and I cannot learn to do otherwise. I have been pretty well the past week and freer from headaches altho' I do not feel very strong.

One episode in Morgan's Civil War career should suggest his character and business methods. On December 31, 1861, under pressure to conserve its resources for the war effort, the Federal Treasury suspended redemption of its banknotes in gold. Because the rest of the Western world remained on the gold standard, this action increased the sensitivity of gold prices

in American and foreign markets to the course of military and diplomatic events. Union army reverses early in the war threatened the security of customs duties, the collection of taxes, and the payment of interest on the rapidly expanding federal debt—all of which were normally payable in gold. The issuance of short-term Treasury paper and some $400 million in "greenbacks" that were unredeemable in specie until 1879 further muddled the value of gold.

With gold at a fluctuating premium over currency (until the resumption of redemption on January 1, 1879), and since many of the government bond issues sold at par for greenbacks but paid interest in gold, opportunities for arbitrage abounded. And because of their intimacy with domestic and international monetary flows, dealers in exchange normally speculated on the price of gold. Morgan was involved in at least one "gold corner" and was a well-known "bull" on the market. His friendship and cooperation in these dealings with Edward B. Ketchum of Morris Ketchum, Son & Co. brought him guilt by association when young Ketchum was imprisoned for fraud. One can "prove" almost anything on the question of Civil War gold speculation, and the real story of Morgan's participation and profits will never be known. Years later, however, he enunciated his philosophy while under oath before a congressional committee:

Q: Would you favor any legislation that would reduce the volume of speculation?

M: No.

Q: You would let speculation run riot?

M: Yes, provided the transactions are legal.

Q: Provided they are genuine?

M: What you call speculation. You cannot prevent the public buying a thing they think is low, or selling a thing that they think is high.

Q: You can prevent them, however, from making fictitious or manipulated transactions?

M: That is another point.

What is certain about Morgan's Civil War years is that he became quite the man about New York. He was a pillar of fashionable St. George's Church and was admitted to membership in the prestigious Union Club. Morgan's business was growing as fast as his reputation. When Duncan, Sherman & Co. severed its relationship with J. S. Morgan & Co., Pierpont's old friend and mentor, Charles H. Dabney, joined his former pupil. On September 15, 1864, the Morgan-Goodwin firm was expanded into "Dabney, Morgan & Co."

Dabney, Morgan & Co., 1864-1871 International capital flows can be either short-term or long-term funds. The former comprise arbitrage funds, which move rapidly back and forth to take advantage of price differentials, flight capital stimulated by political disruptions, and commercial credits arising from trade. Long-term funds are primarily represented by sales of equity and debt securities and the funds transported by immigrants. By the late 1860s, the Euro-American flow of these funds was guided by European bankers such as the Rothschilds, Baring Brothers, J. S. Morgan & Co. (represented respectively by A. Belmont, S. G. Ward, and Dabney, Morgan & Co.,

in New York) and young New York houses with strong European connections, particularly Brown Brothers & Co., the Seligmans, and Jacob H. Schiff, who joined Kuhn, Loeb & Co. in the 1870s.

J. S. Morgan and his associates played a particularly important role in domestic and international dealing in government securities. During the years 1861-1865, the federal government issued $1.3 billion in long-term bonds and $3.7 billion in shorter term, interest- and noninterest-bearing notes and certificates. Flotation of these government issues was initially effected by letting them on competitive bids to small groups of professional bankers and investors. After October, 1862, however, the Philadelphia banking house of Jay Cooke & Co. was retained to sell the securities on commission. Cooke mounted an aggressive sales campaign which reached retail customers through some 2,500 subagents.

Dabney, Morgan & Co. was an active trader in these Civil War issues on commission and its own account, but it took no part in Cooke's sales campaigns. Its allegiance lay closer to the Mortons and Ketchums of New York and the Drexels of Philadelphia, who were Cooke's unsuccessful rivals for government securities contracts.

The Morgans were more active in U.S. governments during the years 1866-1868, when the short-term note and certificate issues of the Civil War were refunded with 6% bonds. They made two unsuccessful overtures to Cooke to cooperate in the flotation of the bonds. Subsequently, they did succeed through open-market operations in moving many of these bonds into European hands. They handled foreign governments as well, including London flotations for Chile and Peru totaling £16 million. In 1870, during the Franco-Prussian War, when the French government had been driven from Paris by the Germans, the elder Morgan organized a syndicate which took a 250 million franc loan of the provisional French government at Tours. The success of the loan brought great prestige and some $5 million profit to J. S. Morgan & Co. and its associates.

As American correspondent and agent for J. S. Morgan & Co., Dabney, Morgan & Co. was involved in these international transactions. But its primary business was on its own account in the commercial paper, foreign exchange, and domestic securities markets. Its balance sheet of January 1, 1869, showed a capital investment of $1,200,000. The personality and standing of the firm are reflected by a confidential report of Dun & Bradstreet:

> . . . J. Pierpont Morgan . . . Is consd. of excellent char., extra ability, shrewd, quick of perception, but oftentimes close & sometimes erratic in minor details which with his peculiar brusqueness of manner has made him & his house unpopular with many. He is the only son . . . of J. S. Morgan of London who is reputed wor. from 8 to $10,000,000, but the greatest part of his present means is the result of his own exertions. He lives well & handsomely, but without great display & is est. wor. from 600 to $700,000. Dabney & Goodwin, the other two prominent partners, are of undoubted char. & standing, the first being always on the cautious side in bus. matters, the latter is of good ability. Have rich & strong bus. friends & relations. Do a conservative, paying bus. & are safe for their engts.

Dabney, Morgan & Co. had special interest in railroading—an interest which was reinforced and broadened by Morgan's business and social friends. Early in 1869, the Jessup and Morgan firms collaborated as commission agents for the successful public sale of $6.5 million of first mortgage, 7% gold bonds of the Kansas Pacific Railway. In May 1869, Morgan helped

negotiate a $500,000 third mortgage on the Albany & Susquehanna Railroad and became its co-trustee. By fall, this commitment plunged him into a contest with the worst of American railroad manipulators. The contestants were Jay Gould, Jim Fisk, and their followers of the Erie Railroad and Joseph H. Ramsey, president of the Albany & Susquehanna, Morgan's client

The A & S ran between Binghamton and Albany and connected with several older roads running sc th into the Pennsylvania coalfields, which needed access to Albany and thence into the New England trade dominated by the New York Central. Gould and Fisk's Erie had launched raids on the A & S's equipment and capital stock. Morgan bought his way onto the A & S board and became leader of the Ramsey faction. Ramsey as president and Morgan as vice president were upheld in their control of the road by a New York Supreme Court decision in December, 1869 and, in February 1870, Morgan negotiated the lease of the Albany & Susquehanna to the friendly and anti-Gould Delaware & Hudson Canal Co. In the words of the *New York Times* of January 24, 1873, "This contest, waged not only by litigation but by force of arms, (i.e., in skirmishes between small and private armies) made Mr. Morgan universally respected as an able financier."

Drexel, Morgan & Co., 1871-1895 The partnership constituting Dabney, Morgan & Co. expired under its original limitation of time on June 30, 1871 and was not renewed. This left Pierpont free to consider an offer from Drexel & Co. Long the most powerful bankers in Philadelphia, the Drexels had invaded New York money markets in the late 1850s. The firm dealt in governments and gold, made mercantile collections, and handled railroad supplies and securities. Morgan's initial reaction was negative. While only thirty-four, he was suffering from general fatigue and was seriously considering retirement. He decided to accept the Drexels' invitation on the condition he might take a year's leave for travel and recuperation. The Drexels agreed and on July 1, 1871, Drexel, Morgan & Co. opened its doors in New York "for the transaction of a General Foreign and Domestic Banking Business." The new firm also served as "Agents and Attorneys for J. S. Morgan & Co., London" and was integrated into the Drexel enterprises through interlocking partnerships.

Drexel-Morgan Partnership, 1871

Drexel & Co., Philadelphia	Drexel, Morgan & Co., New York	Drexel, Harjes & Co., Paris
Francis A. Drexel	Joseph W. Drexel	Drexel & Co.
Anthony J. Drexel	J. Pierpont Morgan	Drexel, Morgan & Co.
James Hood Wright	John Norris Robinson	John H. Harjes
Drexel, Morgan & Co.	Drexel & Co.	Eugene Winthrop
Agents & Attorneys For:	*Agents & Attorneys For:*	
London and San Francisco Bank	J. S. Morgan & Co., London	
German Bank of London, Ltd.		

Morgan returned in 1872 just as his firm was moving into the new seven-story Drexel Building at the corner of Broad and Wall, where it remained until 1914. His role in the large Drexel organization is reflected in a Dun & Bradstreet credit report of 1877:

> . . . The main responsy, rests with the two Drexels who are the principal capitalists of the firm of Drexel & Co. . . . A recent estimate by a party who knows them well sets the Drexels down at between 5 & 6 millions. Mr. Morgan is probably worth $250,000, but being the son of Junius S. Morgan the great London Banker, he would be able to control vry. lgr. facilities if necessary. This young man is smart & is perhaps the most venturesome member of the firm but is kept in check by the Drexels.

Drexel, Morgan & Co. (and its successor J. P. Morgan & Co.) offered a full line of traditional banking services:

> Domestic and Foreign Bankers, Deposits Received Subject to Draft. Securities, Gold, Etc., Bought and Sold on Commission. Interest Allowed on Deposits. Foreign Exchange, Commercial Credits, Cable Transfers. Circular Letters for Travelers available in all parts of the world.

But the major interest of Morgan and the other senior partners soon became the capital requirements of governments and corporations. Throughout the 1870s and 1880s, their fortunes and reputations grew as did the volume of their business.

J. P. Morgan & Co. When J. S. Morgan died in 1890, Pierpont became nominal head of the Morgan partnerships; and on January 1, 1895, two years after the death of Anthony J. Drexel, Drexel, Morgan & Co. was reconstituted as J. P. Morgan & Co. His son-in-law characterized the mature Morgan's appearance and nature at this stage of his career.

> . . . [H]is nose always looked inflamed and swollen, and in later years the trouble was very noticeable and gave him much discomfort. He began by degrees to be more sensitive about his appearance, and developed a shyness that he had never known in his early years. This shyness resulted in his often being brusque, a mannerism that was generally misunderstood.
>
> * * * * *
>
> Regular habits suited Pierpont. He liked to know in advance what he was going to do. . . . [His strengths were] truthfulness and absolute fidelity to his obligations . . . resources and prestige . . . quick, intuitive grasp of a situation, with the details of which he could not have been familiar . . . prompt determination of the question presented . . . bold imaginative and absolute confidence in his own first judgment.
>
> * * * * *
>
> [His desk was] in the thick of it . . . in plain sight of everyone who came in the front door. . . . Anyone who called could speak to him, but anyone who interrupted him unnecessarily or stayed too long was not encouraged to do so

> again. . . . Occasionally he would go on writing or figuring without looking up and make no answer at all. One could never be sure whether he really heard a question or merely did not want to hear it. . . . [He] was probably the most accessible man (except to reporters!) who ever occupied an important position in the banking world.

Small wonder why, in the words of the New York *Sun* of February 29, 1892, Morgan's movements were "watched more carefully than those of any other man in the financial world."

He was, of course, supported by skilled and hard-working associates. The London house was ably managed by his brother-in-law Walter Burns and by J. P. Morgan, Jr. ("Jack"), who had been admitted to partnership in 1892. In New York, a few key partners ran things: two as securities and promotional specialists, one as a railroad-management expert, one as a general banking partner and coal specialist. The railroad genius of the organization was Charles Henry Coster, "a white-faced, nervous figure, hurrying from directors' meeting to directors' meeting; at evening carrying home his portfolio of corporation problems." In drafting documents, Coster "had a great clarity of expression and fertility of invention. He continually had to invent forms and devise methods to meet the problems on which Pierpont was working." When he died suddenly in 1900, Coster was a director of 59 corporations.

The general banking side of the business was strengthened by Henry P. Davison, former president of the Liberty National Bank and vice president of the First National Bank of New York, who became a partner in 1909. The most flamboyant of the later partners was George W. Perkins, the "boy wonder" of the life insurance business. As officer of the New York Life Insurance Co. and member of its finance committee he had set up its domestic and foreign agency system and shaped its portfolio of American, British, German, and Russian securities. Perkins's biographer records the first meeting of Morgan and Perkins:

> He found Morgan in his big, high-ceilinged office separated from his clerks and customers only by an immense glass partition. He was seated at his desk smoking a cigar. [Morgan partner Robert] Bacon performed the introductions and left them there. Perkins launched at once into his story of the Palisades [Interstate Park Commission], but after a moment or two Morgan interrupted him. "I know all about that. You are the chairman of the Commission. What is it you want?"
>
> "I want to raise $125,000."
>
> "All right, put me down for $25,000. It is a good thing. Is that all?"
>
> Flabbergasted, Perkins asked weakly for suggestions as to who else might contribute. Morgan mentioned John D. Rockefeller, and Perkins mumbled something about calling on Mr. Rockefeller right away. Still stunned by the suddenness of Morgan's offer, he thanked the banker and started to leave.
>
> "I will give you the whole $125,000 if you will do something for me," Morgan said calmly.
>
> "Do something for you," Perkins said. "What?"

Morgan pointed across the room where all Morgan partners worked. "Take that desk over there," he said. . . .

. . . "I have a pretty good desk up at the New York Life," Perkins answered.

But Morgan brushed this reply aside with a word. "No," he said bluntly. "I mean come into the firm. . . . Let me know tomorrow if you can."

During his career as partner (1901-1911), Perkins recalled that "I never went behind the counter or examined into the bookkeeping end of the business. My job was to assist in the physical organization of the great industrial combines which Mr. Morgan was then engaged in financing." Before long the New York *World* reported that "George W. Perkins now does all the talking . . . for the firm of J. P. Morgan and Co. Mr. Perkins has the facility of saying just enough and not too much on any subject." Morgan himself took annual and increasingly prolonged vacations after 1895, arguing "I can do a year's work in nine months, but not in twelve."

A division of Morgan's career into categories creates a distortion, for his business was never confined to a single activity. The firms in which he was a partner continued to carry out the services offered by international banking houses. They handled foreign exchange, letters of credit, and other instruments of financing international trade; and they bought and sold government, railroad, and industrial securities. Nevertheless, the Morgan firms concentrated on certain types of businesses at different periods during the years from 1870 to World War I. The shifts in emphasis in his business reveal much about his role in American finance, the way in which he acquired that role, and the financial requirements of the nation's rapidly industrializing economy.

Morgan in Government Finance

During the 1870s, after he had joined the Drexels, Morgan concentrated on this area. Here the opportunity came from the decision of the Treasury Department and Congress to refund the Civil War debt. By the Refunding Acts of 1870 and 1871 the $1.3 billion worth of 5% and 6% long bonds issued during the war were to be retired in favor of $1.8 billion worth of 4% to 5% bonds. Between March and August, 1871 refunding bonds were offered by the Treasury Department through some 900 agencies and through representatives in London, Frankfort, Amsterdam, and Paris. Drexel, Morgan & Co. was one of 51 private bankers named as agents in New York City and J. S. Morgan & Co. was one of 6 appointed in London. The amount of bonds sold through their houses in this manner is unknown, but like all agents they were compensated by a commission of 2% on sales.

Morgan was involved in syndicated refundings of the federal debt between 1871 and 1879. He was also instrumental in dealing with a payroll controversy in 1877 and the gold crisis of 1890-1896. Because of partisan disagreement over the rate of withdrawal of federal troops from the South, Congress in May, 1877 adjourned without appropriating funds to pay the U.S. Army for the fiscal year beginning July 1. Citing his "obvious and sacred duty," Morgan volunteered his firm's resources to the War Department. Although the latter could not legally borrow money or guarantee reimbursement, Drexel, Morgan & Co. went ahead on its own account and risk. Morgan's firm met payrolls of $550,000 per month from July 1, 1877 until Congress reconvened in November and appropriated funds to pay the army and reimburse Morgan.

The gold crisis was more intricately related to mechanisms of trade. American businesspeople in foreign trade whose value received from imports of goods and services exceeded the value they received for their exports incurred a net indebtedness to foreigners. The normal means of canceling these debts was to purchase sterling bills of exchange on London and remit them to one's creditors.

The price of sterling bills of exchange in dollars oscillated around "the par of exchange" of \$4.86-2/3: £1, depending on the balance of trade. When trade balances favored the United States, as they did during fiscal 1878-1883, 1885, 1887-1888, and 1897-1899, sterling bills were readily available near par. Adverse trade balances, such as existed during fiscal 1862-1877, 1884, 1886, 1889-1896, and 1900, increased demand and decreased supply for sterling bills in New York, and prices rose.

The price of sterling bills of exchange in dollars, however, could not rise above \$4.89—the specie export point—that is, the price at which gold itself could be purchased and exported more cheaply than buying a sterling bill of exchange. Whenever sterling bills were unobtainable or their price neared or reached the specie export point, bankers' sterling drafts took over the foreign exchange market. Those seeking sterling funds purchased (in dollars) a sterling draft drawn by a New York banker on his London correspondent.

A banker such as Morgan—who dealt continuously in foreign exchange—had several ways of insuring redemption of his sterling drafts when they were presented abroad. He might cover them by calling claims of his foreign debtors, by drawing against his own foreign deposits, or by borrowing abroad. Normally, however, he converted the check or currency which he received from the purchaser of his draft into gold which he then shipped abroad. He usually obtained this gold from the reserves of New York banks, but his and their ultimate reservoir was the Federal Treasury. Gold was obtainable from the Treasury by presenting legal-tender currency for redemption.

A decline, between 1890 and 1894, in the net gold reserve of the Treasury from \$200 million to \$64 million signaled that the normal interrelationships of trade, exchange, and redemption were severely strained. The decline sprang from many sources. In addition to domestic monetary problems, the balance of international gold transfers, which had favored the United States since 1878, turned adverse in 1889 and remained so. By 1890, American demand for sterling bills on London had driven their price in dollars past the gold export price of \$4.89. The gold reserve of New York bankers was soon depleted in covering sterling drafts and their only recourse was to increase demands on the Federal Treasury's ultimate reserves. In fiscal 1893 alone a net \$88 million in American gold flowed abroad, partly owing to the "panic" (stock market break) of that year.

The effect of these outflows was worsened by negation of the government's prime means for replenishing its gold reserves—the requirement that customs duties (the bulk of federal income) be paid in gold. After 1890, payment in currency or silver became legal, and the percentage of duties paid in gold declined from 90% to below 4% by 1892.

Congress favored currency redemption in silver to ease the pressure on gold and check silver depreciation. President Grover Cleveland and his Secretary of the Treasury, adamant against silver, unable to contract the currency, unwilling to suspend specie payments, and fearing

a gold panic, favored public sale of government bonds to replenish the gold supply. The nation's bankers favored private placement of gold bonds.

A first issue in February, 1894 of $50 million in 10-year 5% bonds was reluctantly taken by a group of New York commercial banks at a minimum price of $117.223, and Treasury gold reserves rose briefly to $107 million. By November, reserves were down to $55 million and a second bond issue of $50 million was floated through Drexel, Morgan & Co. at $117.077. The bankers took these issues at least a point above their resale value and disliked them intensely, since by congressional fiat they were payable in either silver or gold. The bankers continually pressured for an issue "specifically payable in gold."

Drexel, Morgan & Co. and A. Belmont & Co. in New York and J. S. Morgan & Co. and N. M. Rothschild & Sons in London repeatedly conferred with federal officials. A dramatic meeting between President Cleveland and Pierpont Morgan, Morgan's lawyer Francis Lynde Stetson, and Morgan's partner Robert Bacon produced a new plan. The bankers were convinced that the "public will not take any loan not specifically gold bonds at any price satisfactory to U.S. government." Instead, a bankers' syndicate headed by Morgan agreed to purchase 3,500,000 ounces of gold ($65,116,275 worth) and sell it to the government for $62,314,435 in 30-year, 4% bonds. Thus, in effect, the bankers "purchased" the bonds at 104½ and the government was paid 100% in gold.

The keys to Cleveland's acceptance of the plan were two guarantees by Morgan: first, at least one-half the gold would be purchased abroad; second, the syndicate would "as far as lies in their power, exert all financial influence and will make all legitimate efforts to protect the Treasury of the United States against the withdrawal of gold pending the complete performance of this contract." Morgan extracted the assent of all leading New York and European banking houses to his plan. He proposed that for six months the New York bankers continue to sell sterling drafts on London but agree voluntarily not to export any gold to cover their redemption. Rather, they should rely on calling their claims on foreign debts, drawing against their deposits already abroad; and, if necessary, they should borrow in foreign markets.

A final element in Morgan's plan involved the pricing of sterling drafts: should they be priced below the gold export point to discourage further exports of specie? He rejected this possibility as too risky for bankers who might later be forced to honor their drafts at higher prices. Confident of his own and his peers' ability to corner the supply of exchange on London and to prevent exports of gold, he chose to price sterling drafts above the gold export point. He bound his syndicate not to sell drafts below $4.90 and not to export gold. Since there were no bills of exchange on the market and no alternative to the "syndicate price" for sterling drafts, the cost to purchasers was thus $1,500 above the price which they would normally have paid to export gold on every £100,000 of drafts purchased.

The syndicate price held the market from February to June 1895, and even though the adverse balance of trade persisted, almost no gold was exported. In July, however, a New York import house broke the market by selling drafts at $4.89 and covered by exporting gold which it withdrew from the Federal Treasury. In the last six months of 1895, $65 million flowed abroad and this and domestic redemption brought Treasury reserves to a record low of $50 million by January 1896.

In the meantime, the Morgan-Belmont syndicate resold the bonds they had received at 103½ for a public subscription price of 112¼. The offer was subscribed six times over and prompted vehement charges of banker profiteering with journalistic estimates as high as $16 million. When queried in a congressional investigation as to his purposes, Morgan stated, "I had but one aim in the whole matter—to secure the gold that the government needed and to save the panic and widespread disaster that was sure to follow if the gold was not got." When asked why he demanded "exclusive control of the matter," Morgan replied, "Because it was absolutely impossible for more than one party to negotiate—to make the same negotiation for the same lot of gold. It would only have made competition." When asked, "What profit did your house make upon this transaction?" Morgan replied, "That I decline to answer. I wish to state that I am perfectly ready to state to the committee every detail of the negotiation up to the time that the bonds became my property and were paid for. What I did with my own property subsequent to that purchase I decline to state. . . ."

The original books of the Morgan firm reveal that of the $31,157,000 in bonds allotted to the American half of the syndicate, Drexel, Morgan & Co. took less than one-tenth and on these made a gross profit (with interest) of $295,652.93. No data are available as to the profits of the European syndicate.

Morgan in Railway Finance

The Morgan firms, like all international banking houses, were continuously involved in railroad finance. As the American agents for J. S. Morgan & Co. of London, which continued to be a leading distributor of railroad securities in Britain and on the Continent, Drexel, Morgan enjoyed a favored position. Its first big success was the sale of 250,000 shares of New York Central stock for William H. Vanderbilt. In 1879 Vanderbilt, under severe attack in the New York State legislature, faced heavy taxation and adverse legislation as the owner of 87% of the New York Central's stock outstanding. At the same time his recent purchases of the Michigan Central and Canadian Southern, largely in response to Jay Gould's aggressive tactics, convinced Vanderbilt of the costliness of attempting to maintain personal ownership of his railroad properties. He contacted Morgan, asking that the sale he made privately and quietly so as not to depress the price of the stock or give the appearance of financial trouble. Morgan arranged for the sale to a syndicate composed of J. S. Morgan & Co., August Belmont & Co., Morton Bliss & Co., and Jay Gould. The shares, purchased at 120, were sold in London at 130 with no noticeable disturbance in the money markets. Morgan then became a director on the New York Central's board, a position which he held for more than 30 years. Once the news was out, the *Commercial and Financial Chronicle*, New York's leading financial paper, was full of praise for this "grand financial operation."

Morgan's second important coup came in the following year, when he carried out what the *Chronicle* described as "the largest transaction in railroad bonds ever made in the United States." It involved the sale of $40 million worth of bonds of the Northern Pacific. Chartered in 1864 to run from Lake Superior to Portland, Oregon, the Northern Pacific's financing had been taken over in 1869 by Jay Cooke, whose success in selling Civil War bonds had made him America's foremost financier. Cooke's failure to market the road's securities brought his career to a disastrous end and the road into bankruptcy. After a series of reorganizations, mergers, and refundings, the road had by 1879 embarked on a policy of cautious expansion. To finance this growth a syndicate headed by Drexel, Morgan & Co. contracted to sell the $40 million issue of

6% first-mortgage gold bonds. The syndicate took $10 million at 90 and spread the remainder over the next three-and-a-half years at 92½. In return it received 5% commission and placed two directors on the Northern Pacific's board. The syndicate was activated again in October, 1883 to take a major portion of a $20 million second-mortgage issue—$15 million at 87½ less 5% commission in bonds and a 6-month option on $3 million more on the same terms.

These two negotiations, which helped to place Morgan at the center of American railroad finance, provide good examples of his methods. The Vanderbilt sale was one of several in which Morgan sold large blocks of securities on commission for the account of railroad owners or managers. The Northern Pacific transaction was the first of many in which Drexel, Morgan acted as managers of large underwriting syndicates. These syndicates normally agreed to purchase whatever stock, convertible bonds, or convertible notes were not bought in an offering by the corporation's shareholders. Syndicates received a commission of 1% to 5% on sales. The stock was either marketed for account of the syndicate by the managers or distributed to, and paid for by, the underwriters, who disposed of it or continued to hold it until a market was established.

A sample of railroad bond and debenture issues for which Morgan acted as syndicate manager before 1897 includes: $10 million for the Allegheny Valley; £900,000 for the Chicago & Alton; $8 million for the Lehigh Valley; $2.5 million for the Cleveland, Columbus, Cincinnati, & Indiana; £3.6 million for the Baltimore & Ohio; $5 million for the Illinois & St. Louis Bridge; $2.2 million for the Pittsburgh & Connellsville; $7.2 million for the Chicago & Western Indiana; $12.5 million for the New York Central; $11 million for the Lehigh Valley; $11 million for the Cleveland, Cincinnati, Chicago, & St. Louis; $4.5 million for the St. Louis Terminal; and $0.9 million for the New York & Greenwood Lake.

Between December 31, 1897 and January 22, 1913, J. P. Morgan & Co. was sole underwriter for 11 interstate railroad issues of stock and convertible bonds totaling $63 million. The firm managed underwriting syndicates in four instances totaling $204 million. In 122 instances it acted as initial subscribers for bonds and notes totaling $846 million and in another 61 instances it managed subscription syndicates which placed securities totaling $486 million. Morgan was sole initial subscriber for $10 million in Interborough Rapid Transit bonds and manager of a syndicate which subscribed $22 million in Chicago City & Connecting Railways bonds.

In the 1897-1913 period, the Morgan firm in four instances totaling $1.2 million, purchased securities for the account of interstate railroad companies. In 37 cases it sold securities on account totaling $178 million and 28 times it managed syndicates to do the same totaling $235million, 185 million francs, and £1.4 million. In 6 instances totaling $24.5 million J. P. Morgan & Co. loaned money on security collateral to these same railroads. The Morgan firms also participated in railroad underwriting and subscription syndicates managed by others.

As syndicate managers, J. P. Morgan & Co. sold all securities for the account of the syndicate—by either public subscription or private placement—for which it received an additional 1/4% to 2% commission and distributed profits. The pivotal importance of these functions was suggested by Frederick Strauss of J. & W. Seligman in 1917:

> Success in the formation of a syndicate depends to a great extent on the reputation of the syndicate managers for good judgment, fair dealing and success in conducting previous syndicates. In fact, syndicate operations from start to

> finish are based on faith in character, ability and experience. No syndicate member ever asks for an accounting from the managers to the syndicate participants. The letter announcing the distribution of profits or the apportionment of losses sometimes states that the syndicate accounts are on file for examination by any syndicate member, and such accounts are carefully prepared and kept among the syndicate managers' records, but for any syndicate member to avail himself of the offer contained in the letter of the managers, would be regarded by the latter as an intentional affront and business relations between the managers and the inquisitive syndicate member would terminate as soon as the examination of the accounts was completed.

Morgan himself once told a congressional committee that syndicate managers had additional responsibilities:

M: You must remember that securities that are issued and sold do not always prove good . . . when there is no fiscal agent or person responsible for them who will put their name on them. . . .

Q: But the name does not help after the bond is proved bad, does it?

M: It does in this way: The house is called upon to protect those bonds, to assist in the reorganization of the road, to make them good in case of a disaster.

Q: But what I mean is that the banking house assumes no legal responsibility for the value of the bonds, does it?

M: No sir; but it assumes something else that is still more important and that is the moral responsibility which has to be defended as long as you live.

Morgan practiced what he preached. Not only did he, through the reorganization of bankrupt railroads, put them back on their financial feet, he also did his best to prevent the costly competition which he considered the basic cause of the railroads' financial difficulties. He supported Albert Fink's Eastern Trunk Line Association and other similar regional traffic cartels in their attempts to maintain rates; and he used his influence to restrain competitive construction.

Morgan's first move as a peacemaker came in 1885, when he arranged a compromise between the two largest railroad systems in the United States, the Pennsylvania and the New York Central, after each had begun to invade the other's territory. The controversy had its beginning after the West Shore, built parallel to the New York Central from New York City to Buffalo, went into receivership in June, 1884. The road was built shoddily by promoters including Jay Gould who hoped to sell out to Vanderbilt. Vanderbilt, knowing that his well-built, well-run Central would have little difficulty in competing, refused to buy. Then the Pennsylvania began quietly to purchase the bankrupt West Shore's depressed securities. They did so largely because two years earlier Vanderbilt had joined with Andrew Carnegie, who was anxious to break the Pennsylvania's monopoly of transportation out of Pittsburgh, to finance the building of the South Pennsylvania from Reading to Pittsburgh. By late 1884, when the Pennsylvania began openly to improve the West Shore, the construction on the South Pennsylvania was speeded up.

As Morgan was close to Vanderbilt and as the Drexels had long been involved in the financing of the Pennsylvania, the house of Drexel, Morgan & Co. was in a key position to bring peace. Arranging to return from Europe that spring on the same ship as Vanderbilt, Morgan convinced him of the need for compromise. He then invited President George B. Roberts and a senior vice president of the Pennsylvania railroad to join him and Chauncey Depew, Vanderbilt's top operating executive, for a cruise on Morgan's yacht *Corsair*. By the time the boat docked, Roberts and his associate agreed to Morgan's compromise proposal.

Drexel, Morgan & Co. managed the transactions necessary to carry out Morgan's compromise. The New York line was purchased at foreclosure by the West Shore Railway Co., which was organized for that purpose. A Morgan partner became its first president, and several persons close to Drexel, Morgan & Co. were placed on its board. The West Shore was then leased to the New York Central, with a guarantee of principal and interest on $50 million new bonds. It was agreed that the Pennsylvania should buy its enemy at cost, but under state law direct purchase was impossible. Morgan, therefore, personally bought a 60% interest in the road, paying for the purchase with bonds of another road, which securities were provided and guaranteed by the Pennsylvania.

The *Commercial and Financial Chronicle* of February 20, 1886 and September 10, 1887, expressed the view of the conservative business press:

> Since the West Shore settlement we have become so accustomed to peaceable adjustments among the railroads, that we are unprepared for anything else. . . . To railroads, least of all, would our people like to see applied the principle of the survival of the fittest . . . .At this juncture . . . Mr. Morgan conceived the first settlement which was the embryo of them all.

At the end of 1885 Morgan carried his peacemaking activities into another area from which both the Central and the Pennsylvania drew heavy traffic—the anthracite coal region of eastern Pennsylvania. He organized an annual conference of presidents and traffic managers of several anthracite coal carriers including the Philadelphia & Reading, the Delaware, Lackawanna & Western, the Lehigh Valley, and the Delaware & Hudson. Its purpose was indicated by a brief item in the *Commercial and Financial Chronicle* of March 27, 1886:

> *Anthracite Coal Combination*—Representatives of the various coal companies met at the house of Mr. J. Pierpont Morgan this week, and informally decided to limit coal production and maintain prices.

The passage of the Interstate Commerce Act in 1887 enlarged Morgan's role as a railroad peacemaker. That act created a commission to maintain "fair and reasonable rates" and at the same time forbade pooling. Although Albert Fink and the other railroad men who had long advocated legalized pooling were disappointed by the second provision, they still hoped to use the first to stabilize rates. Fink's Eastern Trunk Line Association drew up an agreement and a new set of rates. Violations of these rates were to be reported to the new Interstate Commerce Commission. Tonnage would still be allocated, but there would be no traffic or money pools. A railroad with less than its share of an agreed-upon allotment could obtain a discount from the official rate sufficient to recover its agreed-upon share of the traffic. In the words of the *Railroad Gazette*: "The procedure is that if a railroad is actually found to be losing traffic it would be allowed to quote a differential; but if action results in depriving other roads of their traffic,

it will not be continued on the same scale." The Southern Railway and Steamship Association followed Fink's example for its region. However, concurrence of the roads west of the Mississippi did not come. There, at least six regional associations attempted to set rate differentials and allocate traffic flows. In that area too, where the pressures for competitive construction were the greatest, a number of roads were unwilling to rely on others to supply them with a steady flow of through traffic.

To help bring peace in the West, Morgan in late 1889 invited key participants to a series of conferences in his New York City home. In attendance were the presidents of most railroads west of Chicago and St. Louis, senior partners of the Morgan houses, Brown Brothers & Co., Kidder, Peabody & Co., Baring Brothers & Co., and *ex officio* the presidents of the eastern trunkline railroads. The resulting cartel (later called the Western Traffic Association) bound the western railroad presidents to "strict enforcement of the Interstate Commerce Act, of the maintenance of reasonable rates, [and] the principle of arbitration." There was to be a democratic board of managers which would arbitrate rate conflicts, allocate traffic, and audit the books of constituents to insure compliance. Any violations of the Interstate Commerce Act would be promptly reported to federal authorities and any violations of Association rules would incur a fine of $250.

In addition, at the first conference Morgan pledged his word to clamp down on competitive construction. During the discussion President Roberts of the Pennsylvania complained that overbuilding for competitive reasons could be curtailed only if the investment bankers refused to finance such extensions. Morgan replied, "in behalf of the houses represented here," that if the executive committee of the proposed regional association were able to enforce its decisions, these bankers were "prepared to say that they will not negotiate, and will do all in their power to prevent the negotiation, of any securities for the construction of parallel lines, or the extension of lines not unanimously approved by such an executive committee."

Morgan, elated by the success of his efforts, said in a rare statement to the press:

> I am thoroughly satisfied with the results accomplished. The public has not yet appreciated the magnitude of the work. Think of it—all the competitive traffic of the roads west of Chicago and St. Louis placed in the control of about thirty men! It is the most important agreement made by the railroads in a long time, and it is as strong as could be desired.

Nevertheless, several roads—notably the Illinois Central and the Chicago, Burlington and Quincy—declined membership. The arbitration and auditing committees of this association and others were unable to cope with the volume of cases. Throughout the country rate cutting continued, though less openly and vigorously than before. Then, in 1897, the federal courts declared all "traffic associations" violations of the Sherman Antitrust Act of 1890, and the Western Traffic, the Eastern Trunk Line and the other associations all closed down permanently.

By the early 1890s, well before the courts' decisions, Morgan had, as most railroad executives had done earlier, lost his faith in formal associations to maintain rates. He agreed that consolidation made more sense than combination, even though the building of consolidated systems in the late 1880s and 1890s was leading to major bankruptcies by the mid-1890s. (In 1894, the Interstate Commerce Commission reported that 192 railroads operating over 40,000 miles of road and with a capitalization of $2.5 billion were in receivership.) Morgan now hoped

to go one step beyond consolidation by developing what came to be called "communities of interest" between the new consolidated systems. He used his position as the nation's foremost railroad reorganizer to encourage the creation of such regional alliances.

Morgan's reputation as a railroad reorganizer began in the late 1880s. His firm's first big reorganization, that of the Philadelphia & Reading, came in 1886 and was followed quickly by the reconstruction of the Baltimore & Ohio and the Chesapeake & Ohio. During the severe economic depression of the 1890s, the Morgan firm completed a whole a series of reorganizations. The first was that of the roads which became the Southern system. Next Morgan made the notorious Erie financially viable for the first time in 40 years. Then came a second reorganization of the Reading, and with it one of the Lehigh Valley. (After the Morgan firm had relinquished control of the Reading following its first reorganization, that road had gone on an expansion binge which in three years returned it to receivership, thus convincing Morgan of the need to maintain control after the completion of a financial reorganization.) Late in 1895 he began working closely with James J. Hill on the refinancing of the Northern Pacific and also on a further reorganization of the Baltimore and Ohio. At this same time the house of Morgan was also involved in the reorganization of the Santa Fe.

In the mid-1890s Coster, Stetson, and Coster's successor, Steele, the railroad specialist among the Morgan partners, perfected the pattern of the firm's railroad reorganizations: (1) cash was raised to fund the floating debt and provide working capital by assessments on the stockholders (offering warrants on new securities in exchange), by selective liquidation of quick assets, and sale of new securities; (2) fixed charges were realigned through exchange of new securities for old; (3) the capitalization and fixed charges of the new corporation were predicated on its estimated minimum earning capacity; (4) reserves and new securities were programmed to fund future expenses and expansion; (5) a voting trust was created.

These reorganizations were managed by a committee, usually headed by Coster, which drew plans and met expenses until a voting trust could be established. While Morgan and his associates did not invent the voting trust, they were its prime exponents. Voting trust members were appointed by the reorganization committee and vested with full corporate authority by the stockholders. The incidence and tenure of the major railroad voting trusts controlled by Morgan were as follows:

Railroad	Contractual Tenure	Actual Tenure
Philadelphia & Reading	5 years	5 years (1888-1893)
Chesapeake & Ohio	5 years	5 years (1889-1894)
Richmond Terminal	5 years or until one dividend of 4% on preferred	1 year (1893-1984)
Southern	Same	20 years (1894-1914)
Erie	5 years or until one dividend of 4% on preferred	9 years (1985-1904)
Reading	5 years or until two dividends of 4% on preferred	8 years (1896-1904)
Northern Pacific	5 years	5 years 1896-1901)
Chicago Railways	5 years	5 years (1908-1912)
Chicago, Great Western	5 years	5 years (1909-1914)

In addition to its control of the reorganization committee and the voting trust, the Morgan firm managed all underwriting, subscription, and loan syndicates demanded by the reorganization. It underwrote all assessments on the stockholders, acted as depository and transfer agent for all securities exchanged, subscribed for all additional securities sold to fund the floating or fixed debts, and met expenses and guaranteed coupon payments on maturing bonds during the co...se of reorganization.

For loans, the Morgan firm charged 5% to 6%: as depository and transfer agent, it usually received ¼% commission on the par value of all securities handled; as syndicate manager, it usually received ¼% to 1% commission on sales as well as its profit margin on resale. In addition, it often received cash or blocks of stock in the new corporation for general services rendered, for example: $500,000 in the case of the Erie; $100,000 cash and $750,000 common from the Richmond Terminal.

Some of the results of Morgan's major reorganizations of railroads during the period 1893-1898 are given in Table 1.

Table 1 Conditions Before and After Morgan Railroad Reorganizations Done Between 1893 and 1898

Annual Fixed Charges ($ millions)

Road	Before	After	Percent Decreases
Erie	$8.6	$8.1	5.9%
Northern Pacific	13.8	6.8	51.0
Reading	11.4	9.0	20.8
Richmond Terminal	7.5	4.2	44.0

Types of Securities (%)

Road	BEFORE Bonds	BEFORE Preferred Stock	BEFORE Common Stock	Total	AFTER Bonds	AFTER Preferred Stock	AFTER Common Stock
Erie	58.4%	4.1%	37.4%	100%	45.7%	17.1%	37.2%
Northern Pacific	61.0	16.5	22.4	100	50.2	24.1	25.7
Reading	80.3	0.0	19.6	100	48.0	26.0	26.0
Southern	52.2	8.8	38.6	100	34.5	18.5	47.0

Aggregate Value of Common Stock ($ millions)

Road	Lowest Quotation of Month 1 Year Before Failure	Lowest Quotation of Month 1 Year After Reorganization	Lowest Quotation December 1906
Erie	$67.2	$38.9	$82.2
Northern Pacific	157.6	135.5	289.6
Reading	88.9	71.6	179.2
Southern	45.7	35.2	71.4

In the late 1890s Morgan used his influence over the roads he financed to rebuild regional "communities of interest." One of the first was in the anthracite coal area of Pennsylvania. As his firm controlled the Reading, the Lehigh Valley, and the Erie, and had close connections with

the New York Central, which dominated the Delaware and Hudson and the Lackawanna, Morgan in fact controlled the operations of all the major roads carrying anthracite. He was now able to set price and production schedules far more effectively than had been done through the informal agreements he had effected a decade earlier. In 1899 Morgan expanded this community to include other eastern roads. He arranged for the New York Central to invest in the Lehigh Valley, the Erie, and the Lackawanna, while the Pennsylvania purchased blocks of stock in the Baltimore & Ohio, the Chesapeake & Ohio, and the Norfolk & Western; and the Baltimore & Ohio bought into the Reading. In these same years E. H. Harriman and James J. Hill were creating comparable communities of interest in the West. In 1901, Morgan arranged to form the gigantic Northern Securities Company, which brought the major Hill and Harriman lines—the Great Northern, the Northern Pacific and the Burlington—under the control of a single holding company.

Although the Supreme Court dissolved the Northern Securities Company in 1904, large systems allied through communities of interest continued to dominate American railroad transportation. By 1906, when the passage of the Hepburn Act gave the Interstate Commerce Commission much stronger powers to set rates, two-thirds of American railroad mileage was operated under the surveillance of seven groups: the Vanderbilt roads, including the Chicago and Northwestern (22,500 miles); the Pennsylvania group, including the B&O and the C&O (20,000 miles); the Morgan roads, including the Erie, Reading, and other coal roads, plus the Southern and the New Haven (which Morgan had financed in the 1890s), totaling just under 20,000 miles; the Gould roads in the Southwest (17,000 miles); the Rock Island group, which came to include the Santa Fe (15,000 miles); the Hill systems (21,000 miles); and the Harriman roads (25,000 miles). Besides heading one of the largest groups, the house of Morgan influenced three of the six others: the Vanderbilt, Pennsylvania, and Hill systems.

After 1900, Morgan's continuing interest in railroading lay primarily in rationalizing and occasionally expanding systems in which his firm was already involved. In this period, too, the firm made its only major blunder in railroad finance when it gave Charles Mellen of the New Haven, Morgan's handpicked president, a free hand to buy competing interurban trolley and coastal steamship lines. Mellen's extravagant expenditures forced the New Haven into receivership in 1915. Morgan's firm also attempted, unsuccessfully, to form a large steamship combine, the International Mercantile Marine.

The firm's rapidly growing business in industrial securities is best exemplified in its role in the organization of five new and gigantic firms: General Electric, American Telephone and Telegraph, Federal Steel, United States Steel, and International Harvester.

In the case of General Electric, Morgan was a long-time friend of the inventor Thomas Edison. Together with some of his partners, Morgan had invested in Edison's original patent company (Edison Electric Co., 1878), in the Edison Electric Illuminating Co. of New York, and in their combination as the Edison Electric Light Co. Morgan, who was fascinated by Edison, installed electric lights in his own home, his office, his church, and his yacht. Coster and other Morgan partners helped reorganize the inventor's properties again in 1889 as the Edison General Electric Co. Again in 1891, the Morgan firm participated in the merger of the Edison companies with those of its great rival Thomson-Houston, and Morgan and Coster joined the board of the new General Electric Co. The Morgan firm played an influential role in the development of AT&T without ever participating in a formal reorganization of the company. Originally the long-distance division of the Boston-based Bell System, AT&T had been reorganized in December,

1899 as a holding company for all the Bell companies. Expiration of the Bell patents in 1893-1894 had encouraged competing telephone systems. Barred by its Massachusetts charter from expanding its capital to absorb rivals, AT&T reorganized as a New York corporation and proceeded to acquire other companies, and this marked the beginning of Morgan's direct interest in the firm.

The need of AT&T for fresh capital and the still fragmented nature of the telephone and telegraph industry made for close connections between the company and its bankers. In 1904, Bostonians still dominated the board, and AT&T sold a $20 million bond issue under competitive bidding to Lee, Higginson & Co. and Speyer & Co. This represented the last AT&T bond issue under the competitive bidding system. In 1906, a blanket proposal for issuing $150 million in convertible bonds at management's discretion was passed despite the protests of many stockholders. Although several firms, including Lee, Higginson, expressed keen interest in the issue, the entire lot was sold without competitive bids to syndicates headed by Morgan & Co. The firm remained active in AT&T finance for many years, particularly in its financing of subsidiary companies.

The creation of Federal Steel in 1898-1899 sprang from the bitter competition within the steel industry and the pressure exerted on smaller companies by the powerful Andrew Carnegie interests. The objective was to merge several complementary firms (Minnesota Iron Company, Elgin, Joliet & Eastern Railroad, Illinois Steel Company, and the Lorain Steel Companies of Ohio and Pennsylvania) into one integrated company that could compete more effectively with Carnegie. John Gates, president of Illinois Steel, had tried unsuccessfully to get Morgan to underwrite a proposed merger of wire and nail manufacturers in 1897. The new plan was shaped and organized by Elbert H. Gary, a well-known Chicago corporation lawyer. After perfecting his plan Gary went to persuade Morgan to underwrite the merger and increase the capital on hand from $10 million to $14 million, part of which would be used to buy the Lorain companies.

Up to this point, Morgan's only interest had been protecting some of his clients' interests in Minnesota Iron. Now, impressed with both Gary and his plan, he agreed to head a syndicate for the needed capital. The Morgan firm then purchased the three constituent companies and sold them to a newly created holding company, Federal Steel. In effect, Morgan exchanged $100 million in Federal Steel securities for properties with a combined book value of $77 million and cash on hand of $10 million. For the $4.8 million in cash it provided during the organization, the Morgan syndicate received stock with a total value of $14.1 million, or about 14% of Federal's capital stock. Though Gary emphatically denied that the stock had been watered, the official United States Industrial Commission's report in 1900 noted that: "Altogether, the evidence is strong that a considerable portion of the common stock of the Federal Steel Company represented nothing but 'water.'" After merger, Federal Steel produced about 15% of the steel ingots in the country, but its life proved short. In 1901, it became part of the greatest Morgan adventure of all, the formation of United States Steel.

This gargantuan firm was incorporated as a New Jersey holding company on February 25, 1901. Within a week Morgan, announced the formation of a syndicate to underwrite new securities. The circular noted that "the entire Plan of Organization and Management of the United States Steel Corporation shall be determined by J. P. Morgan and Company." By April 2, 1901, the Steel Corporation had obtained 98% of the stock of eight companies through an exchange of shares: Carnegie Company, Federal Steel Company, National Steel Company, American Steel & Wire Company, American Sheet Steel Company, American Steel Hoop

Company, American Tin Plate Company, and National Tube Company. During the remainder of 1901 U.S. Steel also acquired the American Bridge Company, Shelby Steel Tube Company, and Lake Superior Consolidated Iron Mines.

U.S. Steel was the world's first "billion dollar corporation," and its top management acknowledged that on the basis of the original cost of the properties, the $1.4 billion of securities that they issued was excessive. In 1911 the U.S. Bureau of Corporations (precursor of the Federal Trade Commission) calculated the extent of the overcapitalization. It concluded that the estimated value of the tangible assets acquired by the Steel Corporation amounted to $676 million. The value of the property, tangible and intangible, as measured by the market prices of the securities of all the constituent companies, added up to $793 million. Yet to Morgan the deal and its potential future returns outweighed precise consideration of bargaining and price. Similarly, when Morgan became aware of the importance of acquiring John D. Rockefeller's Lake Superior Consolidated Ore Mines for U.S. Steel, he paid what some associates considered a prohibitive price. Morgan's reported response to criticism regarding the purchase was the query: "In a business proposition as great as this would you let the matter of $5 million stand in the way of success?"

Morgan & Co.'s syndicate cleared $50 million or a 200% return on the amount of funds administered or advanced during the U.S. Steel merger. The Morgan firm itself received $12.5 million more in fees. In return, it had created a company that controlled 66% of steel ingots and castings; 60% of steel rails; 65% of plates and sheets; 77% of wire rods; and 73% of tin and terne plates. Earnings after interest totaled $62 million for the last nine months of 1901 and $90 million for 1902.

The formation of International Harvester involved the leading firms in the fiercely competitive farm machinery industry. The McCormick and Deering companies were each family dominated and bitterly distrustful. Increasing costs of raw materials and growing distribution problems suggested merger, but three attempts during 1891-1901 failed because of friction between the two families. In their search for compromise the McCormicks were directed to George W. Perkins by their (and Morgan's) attorney Francis Lynde Stetson. Perkins took an immediate interest in the case and gradually drew the somewhat naive McCormicks into his confidence. Since Morgan was abroad at the time, Perkins cabled him for permission to take on the assignment. Morgan expressed some doubt that the firm should become involved. In the end he relied upon Perkins's judgment and approved the final settlement.

Originally the McCormicks did not want to involve Morgan & Co. They needed no outside capital, they strongly opposed any stock watering of the new company, and they feared losing control to Morgan. Gradually Perkins convinced them that Morgan & Co. could serve as a balance of power in the new company to arbitrate differences between the McCormicks and Deerings. This reasoning, together with the growing fear that the Deerings might somehow gain control, induced the McCormicks to let Perkins take charge. Perkins described his success to Morgan in a letter of July 11, 1902:

> The Deerings are here, the McCormicks are here, the Plano [plow company] people are here, and we are right down to business, trying to work up a plan by which these concerns can be put together. Already they have agreed that we shall form the new company; that we shall name all the officers and the board of directors; that friends of ours shall constitute a majority of the board of directors

without anybody having the right to question any of these matters. This has been a rather delicate thing to bring about.

The final plan formed the International Harvester Company, with a capital of $120 million in 6% preferred stock deposited in a voting trust until January, 1904, when it was divided on the following percentage basis: McCormicks 42.6, Deerings 34.4, Plano 5.2, Champion 3.7, and Morgan 14.0. About 15% of this stock was estimated as water: $750,000 was paid to the Morgan firm for appraisal, legal, and organizational expenses; $3 million was allowed as a bonus to the firm and did not represent any property conveyed or expenses incurred; and the remaining $14 million arose in the overappraisal of tangible property, patents, and good will.

Perkins' view of his firm's role was explicit: "Morgan & Co. would not think of combatting the united judgment of McCormick and Deering, but would expect to settle controversies between them. In that sense we would be a third party or the controlling spirit of the new company." Of the 18 directors, 5 represented the McCormicks, 5 the Deerings, 3 the legal advisers for both families, 4 the banking interests, and the remaining 1 the required legal resident of New Jersey. Line officers were more or less evenly divided between the families, which resulted in continued friction that threatened to break up the company. In 1906 Perkins and Elbert H. Gary (the Deerings' legal counsel and sometime Morgan attorney) brought about a new compromise that in effect retired the family managers and by 1908 transformed the company into a public corporation listed on the New York Stock Exchange.

The Height of Morgan's Career, 1900-1913

From 1902 to 1912, J. P. Morgan & Co. was directly responsible for the marketing of interstate corporate issues totaling almost $2 billion. (For perspective, the Gross National Product in 1901 was $20.7 billion.) Besides its work in reorganizations and in underwriting and wholesaling securities, it also carried on a large commercial banking business. Some idea of the extent of that business may be gathered from the fact that on November 1, 1912, the New York house had the accounts of over a hundred corporations and had aggregate deposits of $162.5 million. Like other banks (and at the same rate) it paid interest on those deposits and was a considerable lender on the stock exchange, keeping a portion of its quick reserves in call loans.

One striking development in Morgan's influence after 1900 was his cooperation with other financial intermediaries. He had been a friend of George F. Baker, president of the First National Bank of New York, and of James Stillman, president and chairman of the National City Bank, since the 1870s. He invested in those banks' stocks and sat on their boards. In 1909, Morgan, Baker, and Stillman also purchased a majority stock interest in the Equitable Life Assurance Society. It was this group which formed the Bankers Trust Co. in 1903 and the Guaranty Trust Co. in 1910.

Two emergencies illustrate Morgan's financial strength. Because of his control of coal railroads, he was looked upon as the head of the anthracite industry at the time of the great strike of 1902, though he assented to arbitration after President Roosevelt threatened government operation of the mines. And it was Morgan to whom the banking community of New York looked for leadership during the money panic of 1907. He organized the lending of $19 million by solvent banks to relieve pressure on endangered institutions.

Like most businesspeople of his generation, Morgan considered business simply as private enterprise. His firm's reorganization plans were marvels of bank financial disclosure, but he was slow in acknowledging any need of informing the public about the work of corporations. In 1901, he did support the auditing firm of Price, Waterhouse in the contention that consolidated balance sheets should be reported (United States Steel was the first firm in America to use this device) and that there should be publication of quarterly statements of earnings and tonnage of U.S. Steel (considered a doubtful innovation of the time).

Morgan felt the force of public opposition when he had to testify in the Money Trust Investigation in 1912. It may have been this experience that led him to say that "American business must henceforth be done in glass pockets." Before the full implications of the investigation were seen, however, Morgan was gone. He died in Rome on March 31, 1913.

The Money Trust Investigation Popular fear and criticism of the power of bankers, which intensified early in the twentieth century, led to an investigation by the Committee on Banking and Currency, headed by Arséne Pujo, in the U.S. House of Representatives in 1912-13. There is a difference of opinion about the conclusions drawn from the findings of the committee, but there is no question that the published records of its investigation are the most comprehensive source of information on American finance that we have for that time.

From an elaborate table showing the affiliations of 18 leading bankers and banking houses, the report drew the following summaries about various groups:

> The table shows that J. P. Morgan & Co., the First National Bank, the National City Bank, the Guaranty Trust Co., and the Bankers' Trust Co. together have—
>
> One hundred and eighteen directorships in 34 banks and trust companies having total resources of $2,679,000,000 and total deposits of $1,983,000,000.
>
> Thirty directorships in 10 insurance companies having total assets of $2,293,000,000.
>
> One hundred and five directorships in 32 transportation systems having a total capitalization of $11,784,000,000 and a total mileage (excluding express companies and steamship lines) of 150,200.
>
> Sixty-three directorships in 24 producing and trading corporations having a total capitalization of $3,339,000,000.
>
> Twenty-five directorships in 12 public utility corporations having a total capitalization of $2,150,000,000.
>
> In all, 341 directorships in 112 corporations having aggregate resources or capitalization of $22,245,000,000.

The following excerpts point to the committee's conclusions about concentration:

. . . No railroad system or industrial corporation for which either of the houses named has acted a banker could shift its business from one to another. Where one has made an issue of securities for a corporation the other will not bid for subsequent issues of the same corporation. Their frequent and extensive relations in the joint issue of securities has made such a *modus vivendi* inevitable.

This inner group and allies thus have no effective competition, either from others or amongst themselves for these large security issues and are accordingly free to exact their own terms in most cases. Your committee has no evidence that this power is being used oppressively and no means of ascertaining the facts so long as their profits are undisclosed.

The following are selections from the response of J. P. Morgan & Co.:

. . . We ventured to point out to you that such "concentration" as has taken place in New York and other financial centres has been due, not to the purposes and activities of men, but primarily to the operation of our antiquated banking system which automatically compels interior banks to "concentrate" in New York City hundreds of millions of reserve funds; and next, to economic laws which in every country create some one city as the great financial center.

* * * * *

. . . In these tables it is shown that 180 bankers and bank directors serve upon the boards of corporations having resources aggregating 25 billion dollars, and it is implied that this vast aggregate of the country's wealth is at the disposal of these 180 men. But such an implication rests solely upon the untenable theory that these men, living in different parts of the country, in many cases personally unacquainted with each other, and in most cases associated only in occasional transactions, vote always for the same policies and control with united purpose the directorates of the 132 corporations on which they serve. The testimony failed to establish any concerted policy or harmony of action binding these 180 men together, and as a matter of fact no such policy exists. The absurdity of the assumption of such control becomes more apparent when one considers that on the average these directors represent only one quarter of the memberships of their boards. It is preposterous to suppose that every "interlocking" director has full control in every organization with which he is connected, and that the majority of directors who are not "interlocking" are mere figureheads, subject to the will of a small minority of their boards.

Perhaps the greatest harm in the presentation referred to lay in the further unwarranted inference, to which has been given wide publicity, that the vast sum of $25,000,000,000, was in cash or liquid form, subject to the selfish use or abuse of individuals.

* * * * *

These mergers, however, are a development due simply to the demand for larger banking facilities to care for the growth of the country's business. As our

cities double and triple in size and importance, as railroads extend and industrial plants expand, not only is it natural, but it is necessary that our banking institutions should grow in order to care for the increased demands put upon them. Perhaps it is not known as well as it should be that in New York City the largest banks are far inferior in size to banks in the commercial capitals of other and much smaller countries. The largest bank in New York City today has resources amounting to only three-fifths of the resources of the largest bank in England, to only one-fourth of the resources of the largest bank in France, and to less than one-fifth of the resources of the largest bank in Germany. As the committee is aware, in New York City there are only three banks with resources in excess of $200,000,000, while there are ten such institutions in London, five in Berlin and four in Paris.

* * * * *

. . . Since 1907 cooperation has been more active by reason of the lesson which banks in all large cities then learned that, for self-preservation, they could not—as is possible in other countries—rely upon a strong and elastic banking system, but must gain such protection by concurrent action; and second, that such cooperation is simply a further result of the necessity for handling great transactions . . . if transactions of such magnitude are to be carried on, the country obviously requires not only the larger individual banks, but demands also that those banks shall cooperate to perform efficiently the country's business.

* * * * *

. . . Many questions were asked as to the wisdom in having representatives of private banking houses sit upon the boards of corporations, whose securities the same bankers frequently offer for sale. This practice which has been in vogue abroad, ever since the creation of limited companies, has arisen not from a desire on the part of the banker to manage the daily affairs of the corporation or to purchase its securities more cheaply than he otherwise could; but rather because of his moral responsibility as sponsor for the corporation's securities, to keep an eye upon its policies and to protect the interest of investors in the securities of that corporation. For a private banker to sit upon such a directorate is in most instances a duty, not a privilege.

Perhaps the two most widely quoted defenses came from the testimony of two of Morgan's partners. Relentlessly pursued by congressional investigator Samuel Untermyer, Henry P. Davison blurted out: "I know J. P. Morgan & Co. could do no wrong if their endeavors and the circumstance permitted them to do as they wanted to do." George W. Perkins put it more dramatically:

> If J. Pierpont Morgan should make a bond issue from the desert of Sahara and put his name on it, it would be subscribed probably . . . because he has lived an earnest and tremendously strenuous life in the study of these questions for half a century and the people have bought and bought and bought securities that his name has been put to, and have believed that they came out right.

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10

WHARTON REPROGRAPHICS

The Integration of Mass Production and Mass Distribution

The distinctive feature of the modern industrial enterprise is its vertical integration. It combines in a single business firm a number of factories, sales offices, purchasing units, transportation facilities, and sources of raw or semifinished materials. It integrates the processes of mass production with those of mass distribution. This form of business enterprise appeared quite suddenly and simultaneously in a variety of industries during the decade of the 1880s. In all cases, the new enterprises in these industries had the same basic common characteristics. They manufactured using continuous or large batch processes, they developed and used interchangeable parts, and they produced for national and sometimes global markets.

Integration by Users of New Continuous-Process Technologies

The story of James Buchanan Duke provides a revealing example of the rise of a powerful modern industrial corporation. Duke's achievements basically rested on his appreciation of the potential of a cigarette-making machine invented by James Bonsack. Patented in 1882, the Bonsack machine produced, through a continuous-process method, 70,000 cigarettes a day even in its experimental stage. The most efficient hand worker could only produce 3,000 a day. Soon the Bonsack machine was spewing out a daily quota of 120,000 cigarettes. In the early 1880s, 15 such machines could supply the entire world demand.

Duke, a manufacturer of smoking tobacco in Durham, North Carolina, decided in 1881, a year before Bonsack invented his machine, to produce cigarettes because he was having difficulty in competing with a well-established neighbor, Blackwell and Company. At that date cigarettes were still a new and exotic product just beginning to find favor in the growing urban markets. Cigarette smoking was only starting to take the place of pipe smoking, chewing tobacco, cigars, and snuff. In 1881, four cigarette firms produced 80% of the output, primarily for nearby markets.

*Professor Alfred D. Chandler, Jr. prepared this note as the basis for class discussion. It is based on his book, **The Visible Hand** (Cambridge: Harvard University Press, 1977).*

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As a newcomer, Duke was searching for a way to break into the market. The Bonsack machine looked like a good bet. In 1884, shortly after a sharp reduction in taxes on cigarettes permitted a major price cut to consumers, Duke installed two Bonsack machines. He soon realized that they lived up to the inventor's claim. With such machines, each producing 120,000 cigarettes a day, he could easily saturate the American market. To test the world market, Duke had already sent a close associate, Richard M. Wright, on a 19-month overseas tour. At the same time Duke himself developed machinery to package the first mass-produced tobacco product—packages that announced the brand and its virtues. In June 1885, Duke made his final move. He signed a contract with Bonsack to use the machine exclusively to make all his cigarettes, high quality as well as cheap, in return for a lower leasing charge.

Duke's gamble paid off. Output soared. Even before he made his basic contract with Bonsack, he had built a factory in New York, the nation's largest urban market, and had set up his administrative offices there. He immediately intensified a national advertising campaign. Not only did Duke rely on advertising agencies, but his own staff distributed vast quantities of trade cards, circulars, and handbills—all proclaiming the virtues of his brands.

Duke then began to build extensive sales and purchasing organizations. He followed up the contacts Wright had made on his trip abroad by signing marketing agreements with wholesalers and dealers in all parts of the world. At the same time, he and one or two other associates established a network of sales offices in large American cities. These offices, each headed by a salaried manager, became responsible for both marketing and distributing the product. The office kept an eye on local advertising. To obtain orders, its salespeople regularly visited tobacco, grocery, drug, and other jobbers, and a few large retailers. Duke's local sales managers worked closely with New York headquarters to assure effective scheduling of a high-volume flow of cigarettes to jobbers and a few large retailers.

At the same time that Duke and his close associates were building their sales organization, they were creating an extensive purchasing network in the bright-leaf tobacco region of the southeastern United States. Tobacco, after its annual harvest, was normally dried and cured before being sold to manufacturers. The timing of the process varied from several months to two or three years, according to the leaf and the quality desired. Because the supply of cured tobacco depended both on the size of the crop and the availability of curing facilities, prices fluctuated widely. By organizing its own buying, storing, and curing facilities, Duke's company was able to purchase directly from farmers, usually at auctions, and so reduce transaction costs and uncertainties. What counted more was that the company was assured of a steady supply of cured tobacco into its factories in Durham and New York.

By combining mass production with mass distribution, Duke was able to maintain low prices and reap high profits. By 1889, Duke's sales topped $4.5 million, and his profits came to around $400,000 despite heavy advertising costs. To compete, other cigarette manufacturers had little choice but to follow Duke's strategy. They quickly turned to machine production and began to build and enlarge their sales and purchasing organizations. As packages of cigarettes were priced in 5¢ increments—5¢ for the standard package and 10¢ to 25¢ for the better brands—there was little room for price cutting, particularly in the all-important cheaper brands. The manufacturers concentrated on advertising instead. In 1889, Duke's advertising cost rose to $800,000 a year. Here his high volume and resulting cash flow gave him an advantage, for he had a larger cash surplus than the others to spend on advertising. But the cost of these sales campaigns obviously reduced profits.

The desire to control competition caused Duke and his four rivals to merge in 1890, forming the American Tobacco Company. At the time, it was one of the largest industrial corporations in the United States. The oligopoly of cigarettes had become a monopoly. For a brief time the constituent companies continued to operate independently, but after 1893 their functional activities were consolidated into the Duke manufacturing, sales, and leaf (purchasing) departments. As had been the case with railroads and would be again in manufacturing, the largest of the early enterprises became the core organization for continuing growth. The enlarged, centralized, departmentalized company, operating from its New York corporate office, proved extraordinarily profitable even during the economically depressed years of the 1890s. Profits from cigarettes allowed Duke to install new methods of production and distribution in other branches of the tobacco trade. By 1900, the American Tobacco Company had come to dominate the industry completely, except for the making of cigars.

As Richard Tennant, the most careful student of the modern American tobacco industry points out: "The struggle for the cigar industry was the one case in which the [American Tobacco] Trust's methods met with complete defeat." Despite the strongest of marketing efforts, including the creation of an extensive nationwide retailing organization (United Cigar Stores Company with nearly 400 retail stores), and despite the most destructive of price wars, American Tobacco never obtained more than 14% of the nation's cigar trade.

Duke's mistake was his failure to appreciate fully that the American Tobacco Company could use little of its existing organization to make and sell cigars. The processes of both production and distribution were different. Plug, smoking tobacco, and snuff all used high-volume continuous processes of manufacturing and packaging. Their leaf came from the same areas in the southeastern United States, and they were sold to much the same markets and through much the same jobbers as cigarettes. Cigars, on the other hand, were produced by skilled workers in small batches. Their leaf came from Cuba, Puerto Rico, and scattered areas in the northeastern United States. It was cured quite differently from other types of tobacco. Cigars traditionally were sold in small lots to retailers. Like wines, the many different brands had distinctive tastes and flavors. Each appealed to a different type of customer. Cigars were not a product that could be mass produced and mass distributed, nor could the raw materials be purchased in bulk. Since these processes did not lend themselves to high-volume throughput, administrative coordination did not reduce costs and raise barriers to entry. Neither massive advertising nor effective organization could bring the dominance of a single firm to the cigar business.

The history of the match industry closely parallels that of cigarettes except that the development of fully automated machinery for mass production came more slowly, as did packaging and branding. After the Civil War (1861-65), machines began to replace hand production. By the early 1870s, four machine-using firms accounted for 80% of the industry's output. Each had its own specialized machinery, and each concentrated on a single regional market. After a brief period of competition for the national market, these four combined in 1881 to form the Diamond Match Company.

The leading entrepreneurs in the new firm, E. B. Beecher, William Swift, and a man with the unusual name of Ohio Columbus Barber, then agreed on a strategy of improving the basic machinery by combining the best attributes of the different machines used by the erstwhile competitors. The result was, in the words of the firm's historian, "The beginning of the modern continuous, automatic, match machine . . . that revolutionized the match industry." At the same time the company developed comparable machines for the manufacture of paperboard and strawboard boxes. By the early 1890s, 75 workers could produce two million filled matchboxes a day, an output equivalent to that of 500

workers prior to the introduction of the new machines. Production was then consolidated in large plants. In 1880, there were over 30 match factories. By 1900, production was concentrated in one giant plant at Barberville, Ohio and three smaller ones. By then Barber, Beecher, and Swift had built a sales organization that, like Duke's, was responsible for establishing and maintaining contact with wholesalers for local advertising and for coordinating the flow of packages to jobbers and often retailers. Its buying organization began to purchase key supplies such as wood paper and chlorate of potash directly from producers. Soon the company had its own sawing and woodworking mills in Wisconsin and New England. In the 1890s, it began to construct the largest match factory in the world in Liverpool. By the end of the decade it had plants in Germany, Canada, Peru, and Brazil.

New continuous-process methods of production had almost as great an impact on the processing and sales of that ancient American industry, milling of grain, as it had on the nation's oldest commercial crop, tobacco. The innovative efforts of Cadwallader Colden Washburn and the Pillsbury Brothers in the development of the automatic all-roller, gradual-reduction mill assured their enterprises leading positions in the industry. So, too, did a comparable mill built in 1882 by the oatmeal producer, Henry P. Crowell. That mill has been described as "the first in the world to maintain under one roof operations to grade, clean, hull, cut, package, and ship oatmeal to interstate markets in a continuous process that in some aspects anticipated the modern assembly line."

These new continuous-process plants had more immediate impact on the structure of the oatmeal than the flour industry. For a while, at least, the demand for flour was high enough and the costs reduced enough by the new machinery that the "new process" millers had little difficulty in disposing of their output by selling in bulk to wholesalers. On the other hand, the demand for oatmeal was more limited. A new market had to be found if the great volume of output from the new machines was to be sold. As a result, the modern breakfast cereal industry was invented.

The pioneer in developing this product was Henry Crowell, the builder of the first continuous-process mill. While Ferdinand Schumaker, the largest producer, continued to market in the accepted way of selling in bulk through wholesalers, Crowell packaged and then nationally advertised his brand, Quaker Oats, as a breakfast cereal—a product that was even newer to American tastes than was the cigarette. In advertising Quaker Oats, Crowell's staff used box-top premiums, prizes, testimonials, scientific endorsements, and the like. The company set up sales offices in the United States and abroad. Its managers were expected, as were Duke's, not only to maintain contact with jobbers but also to schedule flows from the factory to the jobbers. At the same time Crowell built a buying organization that soon came to include "fieldmen" who purchased directly from farmers in the grain-growing states and buyers who had seats on the Minneapolis and Chicago grain exchanges.

The response of other manufacturers to Crowell's aggressive marketing campaign in oatmeal was similar to that toward Duke's in tobacco. In 1888, after a brief attempt at a cartel, Crowell, Schumaker, and a third large mass producer of oatmeal, Robert Stewart, formed the American Cereal Company. (It became the Quaker Oats Company in 1901.) Despite the determined opposition of Schumaker, who retained his preference for marketing in bulk, the new company took over and expanded Crowell's selling and purchasing organization. Production became concentrated in two giant plants—one at Akron, Ohio and the other at Cedar Rapids, Iowa—each using improved continuous-process machinery. After the turn of the century, to make fuller use of its marketing and purchasing facilities, the company added new lines of wheat cereals, farina, hominy, corn meal, specialized baby foods, and animal feed.

In the early 1890s, as the demand for rolled mill flour leveled off, millers in Minneapolis and elsewhere began to follow the example of the American Cereal Company. Decline in prices at the beginning of the decade initially brought plans for large-scale mergers. These failed, as the leading companies preferred to remain independent. The Washburn firm was reorganized under the presidency of James S. Bell as the Washburn Crosby Company, and the Pillsbury family continued to operate through what became known as the Pillsbury-Washburn Flour Company. Bell and the Pillsburys quickly turned to the strategy of vertical integration. They began to package their products rather than selling in bulk and to advertise their brands, Gold Medal Flour and Pillsbury, on a national scale. During the 1890s they created selling and buying networks similar to those of Crowell. From 1889 on, the Pillsburys had a chain of grain elevators in the wheat-growing regions. Because flour was so widely used and because the supply of wheat was so extensive, a single firm did not come to dominate the industry as in the tobacco, match, and breakfast cereal trades. On the other hand, Pillsbury and Washburn Crosby continued to be the largest American flour millers well into the twentieth century.

The first enterprises to utilize fully the "automatic-line" canning factory were those that developed a product line which permitted more than seasonal operations. The most successful of these were H. J. Heinz and Company of Pittsburgh and the Campbell Soup Company of Camden, New Jersey. In 1880, Henry John Heinz, a small processor of pickles, relishes, sauces, and similar products for the local Pittsburgh market, was still recovering from his bankruptcy in 1876. In the early 1880s, he adopted continuous-canning and bottling processes, built a network of sales offices to sell in the national market, extensively advertised his many brands, and created a large buying and storing organization to assure a steady flow of vegetables and other foodstuffs into his factories. By 1888, Heinz had become one of Pittsburgh's most substantial citizens and was completing one of the largest factories in that industrial center. The company has remained to this day one of the largest food processors in the world.

Less is known about the beginning and growth of the Campbell Soup Company, but it appeared at almost the same time and became large in the same way. It has long remained one of the major business enterprises in the Philadelphia area, and the Dorrance family, who had joined with Joseph Campbell to found and operate the firm, has remained one of the city's wealthiest clans.

Other processors who used large continuous canning plants were those who produced condensed canned milk and canned meats. In 1882, two of the smaller meat packers, Libby, McNeil & Libby and Wilson & Company, began volume production of canned meats in Chicago. At the same time the pioneer in the condensing of milk, the Borden Milk Company, greatly enlarged its operations and expanded and rationalized its marketing and purchasing organizations. It did so partly because of the expanding market but also because foreign enterprises had moved across the Atlantic to exploit the American trade.

In that decade, both the Anglo-Swiss Condensed Milk Company (a forerunner of Nestlé) and the Helvetia Milk Condensing Company (the precursor of two American firms, the Pet Milk Company and the Carnation Milk Company) set up plants and sales organizations in the United States.

Where canning remained seasonal, as was the case for most vegetables, fruit, and fish products, the large canning company did not appear. Instead, canneries came to receive their cans and equipment from two large companies, American Can and Continental Can. American Can, whose first president was Edward Norton, the inventor of the "automatic-line" process, resulted from a merger in 1901. Continental Can was formed in 1906. Only those companies which early in their history had

developed products that could be produced year-round continued to remain large and dominant firms. As late as the 1950s, the largest users of cans still included Campbell Soup, H. J. Heinz, Carnation, Borden's, Pet Milk, and Libby, McNeil & Libby. All but the last have made and some still are making their own cans.

Yet another industry, soap, adopted continuous-process machinery in the 1880s. Soap production for the commercial market had started as a by-product of meat-packing, with small companies processing animal fats for regional markets. In the late 1870s, mechanical improvements in the mixing and crushing process used in making bar soap greatly expanded output. British firms such as Pears and Pond quickly began to advertise in the American market. In 1879, a small Cincinnati soap maker, Procter & Gamble, developed by accident a soap that floated. It was branded Ivory and given the memorable advertising slogan, "It floats." By using new machinery, Procter & Gamble was soon making 200,000 cakes of Ivory soap a day. To sell its volume, the firm began to advertise nationally and then to build a network of branch sales offices. At the same time it created an extended buying organization to assure itself of a steady supply of perishable raw materials—animal and vegetable oils, fats, and soda ash. By 1885, the company had constructed Ivorydale, a model industrial plant, one of the largest in Cincinnati. To make full and integrated use of its facilities, Procter & Gamble then moved into the production of laundry and other soaps, cottonseed and salad oil, and similar products. During the 1880s, other soap manufacturers, including Colgate & Company, N. K. Fairbanks, B. T. Babbitt, and D. S. Brown, built integrated enterprises similar to Procter & Gamble. These large new enterprises soon found themselves competing with meat packers and cotton-oil producers who had moved into soap production as well as with leading European soap manufacturers who had continued to sell in the American market.

Another major innovation in continuous-process machinery appearing in the 1880s was in the photographic industry. In 1884, George Eastman of Rochester, New York, one of the three largest producers of plate glass photographic equipment, devised continuous-process machinery for making gelatin emulsion film. The new film began to come on the market in 1885. Eastman expected the much cheaper film to replace existing plate glass techniques. In order to provide the required volume of photosensitive paper he invented a similar process for its production. To Eastman's dismay, commercial photographers continued to prefer plate glass rather than the less expensive roll film, which was more difficult to handle. To provide a market for his mass-produced film, Eastman concentrated his attention in 1887 on inventing a small, inexpensive hand camera to be operated by amateurs. The new "Kodak" proved an immediate success. To assure a continuing high volume of sales, Eastman then greatly enlarged his marketing organization. He set up branch offices that not only distributed cameras to retail outlets but also handled shipments of customers' exposed and semiperishable film to Rochester for developing and printing. The customer's whole camera was mailed by parcel post to Rochester, unloaded in Eastman's darkroom, reloaded with fresh film, then returned with the developed photographs to the customer. As production of cameras and film soared, Eastman created a network of purchasing offices to buy huge quantities of paper, celluloid, lenses, and other materials. Before 1900, Eastman Kodak, the towering giant of the industry, was beginning to manufacture several of these items in its own plants.

Thus, during a very short period in the 1880s, new processes of production and distribution had transformed the organization of a number of major American industries—tobacco, matches, grain milling, canning, soap, and photography. These changes were revolutionary, and they were permanent. The enterprises that pioneered in adopting and integrating the new ways of mass production and mass distribution quickly became nationally known. By 1900 they were household words. Almost a century later the names of American Tobacco, Diamond Match, Quaker Oats, Pillsbury Flour,

Campbell Soup, Heinz, Borden's, Carnation, Procter & Gamble, and Eastman Kodak are still well known.

Integration by the Processors of Perishable Products

While the mass producers of semiperishable packaged products continued to use wholesalers to handle the physical distribution of their goods, even after they had taken over that intermediary's advertising and scheduling functions, the makers of more perishable products, such as meat and beer, began to bypass wholesalers altogether. The market for perishable products expanded as railroad and telegraph networks grew. As early as the 1850s, crude refrigerator cars were used to bring milk, butter, and meat to urban markets. In the 1870s, when the direct movement of cars over long distances became possible, western meat packers began to ship fresh meat to the eastern cities. Then, in 1881, the modern refrigerated car made its appearance. Gustavus F. Swift hired Andrew J. Chase, a leading refrigeration engineer, to design a car to carry Swift's dressed beef from Chicago to Boston. Again, the 1880s were the crucial decade.

The refrigerator car, however, was not the reason why Swift became the innovator in high-volume, year-round production of perishable products. He became the first modern meat packer because he was the first to appreciate the need for a distribution network to store meat and deliver it to the retailers. He was the first to build an integrated enterprise to coordinate the high-volume flow of meat from the purchasing of cattle through the slaughtering or disassembling processes and through distribution to the retailer and ultimate consumer.

When Gustavus Swift, a New England wholesale butcher, moved to Chicago in 1875, nearly all meat went East "on the hoof." Western cattle were shipped alive by rail in cattle cars to local wholesalers who did the butchering and made deliveries to retailers. Yet the potential scale economies of slaughtering in the West and shipping the dressed meat East were obvious. Sixty percent of an animal was inedible, and cattle lost weight and often died on the trip East. Moreover, the concentration of butchering in Chicago and other western cities permitted a high-volume, continuous operation which not only lowered unit cost but also made possible fuller use of by-products.

To carry out his strategy, Swift, who had begun eastern shipments in 1878, concentrated on improving the refrigerated car and began to build a network of branch houses, first in the Northeast and then, after 1881, in the rest of the country. Each house included refrigerated storage space, a sales office, and a staff to sell and deliver the meat to retail butchers, grocers, and other food shops. Swift soon supplemented this distributing and marketing network with "peddler car routes," which distributed dressed meat in small lots by refrigerator car to small towns and villages.

In executing his plan, Swift met with the most determined opposition. Railroads, startled by the prospect of losing their livestock business, which was an even greater producer of revenue than grain on the route from the West to the East, refused to build refrigerated cars. When Swift began to construct his own, the Eastern Trunk Line Association refused to carry them. Only by using Canada's Grand Trunk, then outside of the association, was Swift able to bring his cars East. At the same time he had to combat boycotts by local wholesalers who, in 1886, formed the National Butchers' Protective Association to fight "the Beef Trust." These butchers attempted to exploit the psychological prejudice of many consumers against eating fresh meat that had been killed days or even weeks before more than a thousand miles away.

Nevertheless, high quality at low prices soon won out. Though Swift did rely on advertising to counter prejudice against his product, it was clearly the prices and quality made possible by high-volume operations and the speed and careful scheduling of product flow that won the market. Once the market was assured, Swift had to expand his production facilities to keep up with demand. He increased his speed of throughput by subdividing the processes of butchering and by using moving "disassembly" lines. In the 1880s and early 1890s, Swift & Company built new packing plants in six cities along the cattle frontier. The company then bought into adjoining stockyards where staff from its purchasing department became experts in buying cattle in volume.

Other packers realized that if they were to compete with Swift in the national market they must quickly follow his lead. By the end of 1882, Philip D. Armour of Chicago and George H. Hammond of Detroit were beginning to build comparable networks of branch houses and to compete with Swift for the best locations along the railroad lines. Nelson Morris of Chicago and the two Cudahy brothers of Omaha constructed similar networks in the mid-1880s. The oligopoly was rounded out when the New York firm of Swartschild and Sulzberger completed a comparable integrated national enterprise in the early 1890s. Except for Hammond, who died in 1886, all these entrepreneurs quickly enlarged their processing facilities, built new packing plants in other western cities, bought into the stockyards, and expanded their fleet of refrigerated cars. Well before the end of the eighties, a small number of very large, integrated meat-packing firms dominated the dressed-meat business, and they continued to do so well into the twentieth century.

Improved transportation also encouraged several brewers to enter the national market. In the 1880s, a pneumatic malting process increased speed and improved control in the process of brewing beer. At the same time the development of temperature-controlled tank cars made it possible to distribute the product nationally. Up through the 1870s, brewers sold only within a relatively small radius of their plant, relying on traveling salespeople to sell the product by the barrel to wholesalers. In the 1880s, Pabst, Schlitz, and Blatz of Milwaukee; Lamp and Anheuser of St. Louis (the able Adolphus Busch took over Anheuser in 1880); and Moelin of Cincinnati all began to build nationwide distributing networks and to use advertising agencies to reach the national market. For example, in early 1879 Pabst had only one branch, in nearby Chicago. That year a second was set up in Kansas City. Between 1881 and 1894, the company built 30 more branches in every part of the country. Although Pabst used wholesalers in some cities, an increasing proportion of sales were made through company offices that stored, distributed, marketed, and advertised the Pabst product. In 1887, Pabst went one step further by moving into retailing. It purchased saloons and then rented them to operators. In the same years, Pabst and the other national brewers expanded their purchasing organization, using them to buy high-quality malt, barley, rice, hops, and other materials in large quantities with precise specifications. They also set up barrel-making plants and purchased timberlands. By the 1890s, these integrated enterprises were, like the meat packers, among the largest businesses in the land.

Integration by Machinery Makers Requiring Specialized Marketing Services

The other type of manufacturers to bypass wholesalers were the makers of recently invented machines produced in volume through the fabrication and assembly of interchangeable parts. The sales of these mass-produced machines required marketing services that the existing wholesalers and retailers had difficulty in providing. The history of the production and distribution of sewing machines, the first of this type of machinery to be developed, indicates the nature of these marketing needs. By 1851, sewing machines had been perfected so that they could be sold commercially; but manufacturers were not able to make them in quantity until the legal battle over patents was settled

in 1854 and a patent pool formed. The winner of the court trials, Elias Howe, insisted that the pooled patents be released to 24 manufacturers. Nevertheless, the industry became dominated within a very short time by the three firms that first built marketing organizations—Wheeler & Wilson Co., Grover and Baker, and I. M. Singer Company. These manufacturers at first relied on full-time but independent agents who, though receiving a small salary, were paid primarily on a commission basis and were solely responsible for marketing activities within their territories. The manufacturers quickly learned that these agents had little technical knowledge of the machines. They were unable to demonstrate them properly or to service and repair them. Nor were the agents able to provide credit if customers needed to pay for these relatively expensive goods in installments.

As an alternative, Grover and Baker set up a company-owned and operated store to provide such services. By 1856, Grover and Baker had already established such branch offices, as they were called, in 10 cities. In that year Isaac Merritt Singer decided to follow suit. So, almost immediately, did Wheeler & Wilson. By 1859, Singer had opened 14 branches, each with a female demonstrator, a mechanic to repair and service, and a salesperson or canvasser to sell the machine, as well as a manager who supervised the others and handled collections and credits. Nevertheless, because finding and training personnel took time, these three enterprises continued to rely heavily on commission agents to market their goods. The swift selection of these agents and the building of branch stores made it possible for these three firms to dominate the industry. By 1860, they produced three-fourths of the industry's output, with Wheeler & Wilson manufacturing 85,000 machines in that year and the other two 55,000 apiece.

After 1860, Singer moved more aggressively than the other two in replacing regional distributors with branch stores supervised by full-time, salaried regional agents. Edward Clark, Singer's partner and the business brains of the partnership, had become even more convinced as time passed of the value of relying on the company's own sales force. Independent agents had difficulty in supplying the necessary marketing services, and they failed to maintain inventories properly. They waited until stocks were low and then telegraphed large orders, requesting immediate delivery. They seemed to be always either understocked or overstocked. Moreover, the agents were frustratingly slow in returning payments made on the machines to the central office.

Therefore, Clark was constantly on the outlook for people he could hire as salaried "general agents" or regional managers of geographical districts to supervise existing branch stores and to set up new ones. Where such people could not be found, Clark continued to rely on independent agents; but he insisted that these dealers set up branch offices similar to those in a company-managed district.

When Clark became president in 1876, a year after Singer's death, he decided to eliminate the independent agencies altogether, at home and abroad. Singer's central offices in New York and London had as yet scant control over the branch stores of the independent distributors and, in fact, relatively little control over their own salaried agents. Not much effort had been made to sell in any systematic or standardized way. Little uniformity existed in sales, accounting, credit policies and procedures. The techniques of administrative coordination had not yet been perfected. In 1877, the last patents of the 1856 pool were to expire. After that year Singer would have to compete at home, as it had long done abroad, without patent protection.

Working closely with George Ross McKenzie, a Scot who helped to build Singer's overseas sales organization and who succeeded him as president, Clark gradually reorganized and rationalized Singer's marketing and distribution network. First, he completed the replacement of independent distributors with regional offices staffed by salaried executives. Then he installed everywhere similar

branch offices with teams of canvassers as well as people doing repair and accounting. Such offices had proven particularly successful in Great Britain, an area where Singer had never enjoyed patent protection. The network made possible aggressive marketing, reliable service and repair, and careful supervision of credits and collections. It also assured a steady cash flow from the field to headquarters in London, Hamburg, and New York.

In the period immediately after 1878, Clark and McKenzie perfected the procedures and methods needed to supervise and evaluate this branch office network. In the United States, 15 regional "general agencies" reported to the central office in New York. In Europe and other parts of the world, branches were supervised by 26 regional sales offices. The managers in charge of those in Northern and Central Europe reported to headquarters in Hamburg. Those in the rest of Europe, Africa, and the Near East reported to London, while those in Latin America, Canada, and the Far East were supervised by the central New York office.

The expansion and reformation of the marketing organization resulted in a constant increase in Singer's sales and therefore in the daily output of its factories and the overall size of the enterprise. In 1874, the company built by far the largest sewing machine factory in the world at Elizabethport, New Jersey. During the 1880s, this plant grew in size, but its capacity was surpassed in 1885 when the company constructed a factory in Kilbowie, Scotland, a suburb of Glasgow. That plant, with a rated capacity of 10,000 machines a week, was itself constructed to replace a smaller plant built in Scotland in 1867. Both plants were constructed to improve coordination between production and distribution. The filling of hundreds and then thousands of orders in Europe from the American factory became more and more difficult. Such delays became the major cause for losing orders. In 1866, for example, the head of Singer's London office complained that the inability to deliver machines had "utterly ruined" the company's business in Britain. All Singer's capital facilities—its two great factories, a small cabinetmaking plant in South Bend, Indiana, and a foundry in Austria—were financed out of current earnings.

Increased demand in these years caused Singer to expand and systematize its purchasing operations. By the 1890s, the company had obtained its own timberlands, an iron mill, and some transportation facilities. These purchases were also paid for from the ample cash flow provided by sale of the machines. Indeed, the company often had a surplus, which it invested in railroad and government bonds and even in other manufacturing firms. Both insiders and outsiders credited Singer's business success to its marketing abilities and organization.

Organization also appears to have been a critical element in the success of the leading manufacturer of the most complex agricultural machine, the mechanical reaper. According to a grandson who wrote a detailed history of the family enterprise, Cyrus McCormick came to lead the field because he "had at his back the best business organization." During the 1850s, the rapid expansion of railroad and telegraph networks permitted the inventors of reapers, harvesters, and other agricultural machinery to build sizable factories for the first time. In marketing their products, McCormick and his competitors, Obed Hussey, John H. Manny, and Lewis Miller, relied, like the sewing machine makers, on territorial agents or distributors. The agents received a small salary, usually \$2 a week, plus a 5%-10% commission. Fully responsible for all sales activities in their districts, they hired subagents or dealers who made the actual sales, handled service and repair, granted credit, and supervised collections. McCormick differed from his competitors in that he kept a closer surveillance over distributors through a team of "traveling agents" and through constant correspondence.

The depression of the 1870s caused McCormick to centralize his sales organization, which by that time had come to include almost 50 distributing agencies. At about the same time that Clark and McKenzie began to phase out the independent distributors at Singer, McCormick decided to replace his regional agents with offices staffed by salaried managers and employees. The subagents who were formally hired and supervised by the agent now became franchised dealers. These dealers, usually local livery men, storekeepers, and the like, signed a contract with the company directly. The contract stipulated a dealer's duties in the selling of machines, spare parts, wire, and later, twine for binding. It normally pledged the dealer to handle only McCormick reapers and harvesters but permitted the marketing of other types of implements made by other manufacturers.

The primary task of the regional office manager was to keep a close watch on the dealers. He also supervised customer credit and collection and handled local advertising. That office had a number of salespeople who assisted the dealers and often made sales on their own account. The regional office also included trained mechanics, who assembled the machines when they arrived from the factory, demonstrated their operations, and serviced them when needed. During the harvest season, the factory would normally curtail production and send out skilled employees to the branches to assist in servicing. In the mid-1880s, the company employed 140 such "field experts." By creating a regional office network, McCormick pioneered in forming a sales organization to back up franchise dealers who did the retailing, much as Singer had innovated in developing its network of company-owned and -operated branch retail stores. In the 1880s and 1890s, McCormick began to extend its sales overseas to the wheat-growing regions of Europe, Australia, and New Zealand. For foreign marketing it relied on local independent distributors until the late 1890s.

As at Singer, the expansion of the marketing network caused an increase in factory output. Between 1880 and 1884, output grew from 20,000 machines annually to 50,000. To assure continuing flow of goods into the factory, the company systematized purchasing. To meet its requirements of 10 million board feet a year of ash, hickory, oak, and poplar, the company began in 1885 to buy timber tracts and sawmills in Missouri and Alabama.

In the late 1870s and 1880s, other manufacturers of harvesters and other costly agricultural machinery began to build or expand marketing organizations similar to those of the McCormick company. Walter A. Wood & Co., D. M. Osborne & Co., William Deering & Co., producing the new Appleby Twine Binder, and Warder, Bushnell & Glessner Co., makers of the Champion line, all created national branch office networks. So did the J. I. Case Threshing Company, Inc. and the three leading makers of modern steel plows—John Deere & Company, the Moline Plow Company, both of Moline, Illinois, and the Emerson Brantingham Company of Rockford, Illinois. The three plow makers quickly moved to making other less complex implements, including drills, wagons, mowers, and spreaders, in order to use their sales organizations more fully. All of these firms, like McCormick, began in the 1890s to integrate backward, obtaining hemp and timberlands and, in some cases, even mines.

The integration of mass production and mass distribution of newly invented office machines followed much the same pattern as sewing and agricultural machinery. Scales, letter presses, typewriters, cash registers, adding machines, mimeograph machines, calculators—all required the building of a large marketing organization if the product was to be manufactured in volume. And so the first firms in the field long continued to be the dominant ones.

The experience of the first mass producer of the earliest business machines, E. & T. Fairbanks of St. Johnsbury, Vermont, paralleled McCormick's. Fairbanks, a manufacturer of weighing scales

essential to the shipment and sale of goods, began in the 1850s to sell through regional agencies. As at McCormick, "itinerant agents" closely supervised their activities. After the Civil War, the firm built a network of regional branch offices with salaried managers, "scales experts," and canvassers to sell machines, provide consumer credit and continuing service, and also assure steady flows of goods to and cash from the customers. To make full use of its marketing organization, the company quickly began to develop a full line, selling letter and waybill presses, warehouse trucks, and "money drawers," the predecessors of the cash register.

The pioneering firms in the manufacturing of typewriters and cash registers, which set up their sales forces in the 1880s, relied more heavily on canvassers and small Singer-like branch offices than did Fairbanks. John H. Patterson attributed the swift growth of his innovative enterprise, National Cash Register, after 1884—and with it the expansion of the industry as a whole—to the strength of his canvassing force, the training and competence of his salespeople, and the ability of his marketing organization to provide credit and service.

The Remington experience underlines in dramatic fashion the necessity of creating an extensive marketing organization to sell a new office machine in volume. As the Civil War came to a close, E. Remington and Sons of Illion, New York, one of the first companies to mass produce the modern breech-loading rifle, began to look for products to use their specialized manufacturing facilities and skills. In 1865, they set up the Remington Brothers Agricultural Works to make mowing machines and cultivators. Because they did not attempt to develop a marketing organization, the enterprise failed. Next they were approached by a former Singer executive to produce an improved sewing machine. Again they failed. The machine was excellent, but, in the words of Remington's historian, "To sell it was another matter." They had little success in quickly creating an effective sales organization, and without it, Remington had little chance of competing successfully with Singer and the other established firms.

In 1873, the inventor of the typewriter, Christopher L. Sholes, came to the Remingtons and asked them to manufacture his typewriter at their Illion plant. This time they moved more slowly, selling the product at first through E. & T. Fairbanks. When, in 1881, the typewriter proved a commercial success, the Remingtons hired a small team to build a sales force. Because the salespeople concentrated on the home market, they asked Singer to sell their products abroad. When the Singer company refused, they began to set up their own marketing organization overseas. In 1886, difficulties in the gun business, as well as other activities, brought the Remington Arms Company into bankruptcy. Those who were developing the typewriter sales organization then bought out the company's typewriter interests and set up a new firm, Remington Typewriter Company. Soon their enterprise was as successful as Singer or National Cash Register. A number of rivals appeared, but only the Underwood Company and the Wagner Typewriter Company, which built similar sales organizations, succeeded in becoming significant competitors.

As the experience of all the new mass-produced machinery companies suggests, firms could sell in volume only if they created a large, multi-unit marketing organization. All their products were new, all were relatively complicated to operate and maintain, and all were costly.

This was even more true for the makers of new, technologically advanced, standardized machinery that was sold to other manufacturers to be used in their production processes. Because such producers' goods were even more complex and more costly, they required specialized installation as well as closer attention to after-sales service and repair. The sales forces for such manufacturers required more professional training than did persons selling light machines in mass markets.

Salespeople often had degrees in mechanical engineering. Again, it was the decade of the 1880s when enterprises in these industries began to build or rationalize national and global sales forces.

An excellent example of enterprises producing and marketing in volume for global markets were the makers of recently invented machinery to generate, transmit, and use electricity for power and light. The salespeople at Westinghouse, Thomson-Houston, and Edison General Electric (the last two combined to form General Electric in 1892) all knew more about the technical nature of their equipment than did most of their customers. Moreover, few independent distributors could obtain a firm grasp for the rapidly changing new technology. Because of the dangers of electrocution and fire, it was necessary for trained, salaried employees of these companies to install, service, and repair their products.

Moreover, financing involved large sums, often requiring extensive credit which smaller, nonintegrated producers were unable to provide. Thomson-Houston, Edison Electric, and, to a lesser extent, Westinghouse, began to finance new local central power stations in order to build a market for their machinery.

In these pioneering years of the electrical equipment business, technology was developing fast, and coordination between the sales, production, and purchasing departments involved more than scheduling flows of material. It meant that salespeople, equipment designers, and manufacturing executives had to be in constant touch to coordinate technological improvements with market needs so that the product could be produced at low unit cost. It also meant that independent sales agencies had little chance of acquiring the skills necessary to market the product.

Other manufacturers, whose products were based on electricity, developed in these same years similar marketing organizations with worldwide networks of branch offices. Such enterprises included Western Electric, the subsidiary of American Bell Telephone, which produced telephones and equipment necessary to relay calls; the Johnson Company, which built electric streetcar rails and switches; and the Otis Elevator Company. Otis, established in 1854, began to expand after 1878, when it built its first high-speed hydraulic elevator for commercial buildings. The coming of electricity, a flexible source of power, helped the company expand its market. The branch office network created at Otis in the 1880s permitted it to dominate the business completely abroad as well as at home well into the twentieth century, when Westinghouse became a major competitor.

Other makers of standardized machinery built comparable organizations in the 1880s. One was Babcock & Wilcox, makers of steam boilers and steam machinery, founded in 1881 and financed by Singer Sewing Machine Company profits. Another was the Henry B. Worthington Company, maker of pumps and hydraulic equipment for urban water and sewage systems in all parts of the world. In this same decade Link-Belt Machinery Company, makers of conveying and transmission machinery, and the Norton Company, makers of grinding wheels and grind wheel machinery, set up widespread sales and buying networks.

The makers of the new machinery so central to the mechanization of American agriculture, business, and industry created similar integrated enterprises at about the same time and in about the same way. The organization, operation, and financing of these durable goods enterprises was comparable to those of the firms that pioneered in the mass production and mass distribution of semiperishable and perishable products. Nearly all of the machinery makers either built or perfected their marketing and purchasing organizations in the decade of the 1880s. In nearly all cases, production remained concentrated in a small number of large plants. To manage their multifunctional

enterprises, they built similar centralized, functionally departmentalized organizational structures. They differed from the manufacturers of perishable and semiperishable goods in that the purchasing organizations were smaller. The makers of the new sewing machine and agricultural and office machinery integrated backward to control supplies of raw and semifinished materials, but this was less common among the makers of electrical equipment and other heavy machinery. But, like the producers of perishables and semiperishables, these machine companies continued to dominate their industries for decades.

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Mass Production and the Beginnings of Scientific Management

This case consists of an introductory note followed by seven documentary readings. The documents deal with the origins of "scientific management" as defined and practiced by Frederick W. Taylor and his disciples, and provide a critique of the Taylor system and of scientific management in general.

I. Introduction: The Coming of Mass Production

High "throughput" was as basic to mass production as high "stockturn" was to mass marketing. The greater the throughput for a given plant and set of equipment, the lower the unit costs and the greater the possibility of increased profits. High throughput could be obtained and then increased in a number of ways. Machinery and equipment could be improved and operated at higher speeds. Energy inputs could be increased. Organizational designs and administrative procedures could be adapted and improved to assure a continuing steady regular flow of materials from one part of the process of production within the plant to the next. Both workers and managers could become more skilled at their tasks. Except for this last, all these ways of increasing throughput raised the ratio of capital, materials, energy, and managers to the size of the work force. Mass production processes thus became capital-intensive, energy-intensive, materials-intensive, and manager-intensive.

The possibility of increasing throughput varied with the technology of production. The potential for expanding productivity was low in industries where mechanization had resulted in merely the replacement of manual labor by simple machines. This was the case in the making of cloth, wood, apparel, shoes, saddlery, furniture, flooring, and the printing of books, journals, and magazines. Once the basic machinery was perfected, better trained workers and managers could raise the productivity of the plant, but the primary way to increase output was to add more machines and more workers.

*This case was originally prepared by Professor Alfred D. Chandler, Jr. as the basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation. The introduction is from Alfred D. Chandler, Jr., "Evolution of Enterprise: The United States" in Peter Mathias and M.M. Postan (eds.), **The Cambridge Economic History**, Vol. VII, Part 2 (Cambridge, England: Cambridge University Press, 1978). The documents were taken partly from a case (No. 374-352) compiled by Professor Chandler in 1972 entitled "Modern Management Begins," and partly from a case (BH118) originally prepared by Josepha M. Perry, called "Selections on Scientific Management." Professor Thomas K. McCraw revised and abridged the case.*

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Industries using such processes of production remained labor-intensive until well into the twentieth century. Theirs continued to be factory production similar to that of the early textile mills. The one change in organization was that all activities for such manufacturing enterprises came to be centralized under the control of a single person or office.

By contrast, in the refining and distilling industries, modern high-speed, high-volume continuous or large batch mass production came very quickly. By 1869, a decade after the drilling of the first commercial oil well, some petroleum refineries required almost no manual labor at all. Similar innovations occurred in the refining of sugar, cottonseed oil, linseed oil, the brewing of beer, and in the distilling of whiskey, industrial alcohol, sulfuric acid and other chemicals. Production units in these industries quickly became very capital-intensive, energy-intensive, materials-intensive, and manager-intensive. In such industries expansion in the size of the plant made possible much greater economies of scale than in the labor intensive mechanical ones. For example, when the Standard Oil Trust reorganized its refinery capacity in 1883 and concentrated almost two-fifths of American refinery production in three huge refineries, the unit cost dropped from 1.5 cents a gallon to 0.5 cents. A comparable concentration of two-fifths of the nation's output of textiles or shoes in three plants would have been impossible, and in any case would have brought huge diseconomies of scale and consequently higher prices.

In other industries, particularly those processing agricultural products, a high rate of throughput was achieved through the invention of continuous-process machinery and the designing of continuous-process plants. In the late 1870s and the early 1880s such innovations appeared in the making of cigarettes, the canning of soups and milk, the production of soap and photographic film, and the milling of flour, oats, and other grains. These industries quickly became capital-, materials-, energy-, and manager-intensive. However, once the machinery and the plant design had been perfected, still further increases in productivity were difficult. This was also true of the refining and distilling industries.

The greatest continuing potential existed in the furnace and foundry industries, particularly metal-making and metalworking. In the metal-making industries, the integration of several operations within a single works provided huge opportunities for increased productivity. In the metalworking ones, the subdivision of processes into more specialized units created similar opportunities. It was in these two kinds of industries that modern American factory and works management was perfected.

In metal-making, the most dramatic example of rapidly increasing productivity came in works that integrated blast furnaces, rolling mills, and finishing mills to make rails, wire, sheets and structures. The adoption of the Bessemer and open hearth steel processes enormously increased the volume of output through the adoption of massive machinery and an intensive use of energy. Moreover, as emphasized by Alexander J. Holley, the engineer who built nearly all of the new Bessemer works in the United States, the larger output of American over British steel mills came not only from improved converters and other equipment but also from the careful layout of plants. Some of Holley's designs, especially for the Carnegie Company, included as many as 70 buildings and 30 miles of internal railway. As Holley noted, "Better organization and more readiness, diligence and technical knowledge on the part of management have been required to run works up to their capacity, as their capacity has become increased by better arrangement and better appliances." As the economic historian Peter Temin has pointed out,

> The speed at which steel was made was continually rising, and new innovations were constantly being introduced to speed it further. Steam and later electric

> power replaced the lifting and carrying action of human muscle, mills were modified to handle steel quickly and with a minimum of strain to the machinery, and people disappeared from the mills. By the turn of the century, there were not a dozen men on the floor of a mill rolling 3,000 tons a day, or as much as a Pittsburgh rolling mill of 1850 rolled in a year.

As steel and other metal-making works became capital- and energy-intensive, they required an increase in the ratio of managers to workers because of an enhanced need for supervision and control.

The organizational design and the operating procedures of the new iron and steel enterprises owed much to the railroads. The connection between the railroads and the iron and steel industry had always been close. The first Bessemer rail mills were financed by railroads. The steel industry's foremost entrepreneur, Andrew Carnegie, received his business training as division superintendent of the Pennsylvania's Pittsburgh Division.

Carnegie brought W.P. Shinn, an experienced professional manager, from the Pennsylvania Railroad to become the general manager of a new steelworks built near Pittsburgh in the mid-1870s. Shinn introduced and modified railroad accounting and cost techniques, including a voucher system employed in the locomotive shops. His daily cost sheets and other data were used to determine costs and prices and to evaluate departmental performance. No order was accepted until its costs had been carefully estimated. Weekly and monthly reports went to the company's board of managers, made up largely of department heads, and to Carnegie himself. According to one of the company's executives, "the minutest detail of cost of materials appeared from day to day and week to week in the accounts and soon every man in the place was made to realize it. The men felt and often remarked that the eyes of the company were always on them through the books." Carnegie used the accounts to evaluate technological innovations. And where Carnegie pioneered, others quickly followed, not only in the making of iron and steel but in the production of copper, zinc, glass and paper.

It was in the metalworking industries, however, that incremental improvements in machinery, organizational design, and managerial performance made the most difference. Metal is more difficult to shape than are stone, wood or leather, but it can be shaped to much finer tolerances and much more precise specifications. Between the 1850s and 1880s major innovations occurred in milling, grinding, and stamping machines, in lathes, and in other equipment for cutting and working metal. These innovations involved not only machine design but also the development of metal alloys that improved the cutting edges of tools and, therefore, sped up their operation.

Organizational design and managerial skills were particularly important in metalworking industries because their production processes permitted a high division of labor. This specialization, by increasing the number of subdepartments within a works, made managerial tasks more difficult. They became most difficult in enterprises that mass produced machinery and other products through the fabrication and assembly of interchangeable parts. These included firms making firearms, locks, clocks, watches, sewing machines, typewriters, cash registers, harvesters, threshers, and other complex agricultural machinery, electrical machinery, pumps, and other heavy equipment.

During the 1850s and 1860s the managers in charge of metalworking enterprises concentrated on improving machinery and plant design. Only after the depression of the 1870s created pressures to cut costs did they begin to pay close attention to improving organizational design. The innovators in the new "scientific" methods of shop and factory management were nearly all mechanical engineers connected with metalworking industries. In fact, the history of the scientific management movement

in the United States can best be followed in the *Proceedings* of the meetings of the American Society of Mechanical Engineers, founded in 1880. At the Society's annual meeting in 1881, Henry R. Towne, head of the Yale & Towne Lock Company, delivered a presidential address entitled "The Engineer as an Economist":

> Under the heading of Shop Management fall the questions of organization, responsibility, reports, systems of contract and piece work, and all that relate to the executive management of works, mills and factories. Under the heading of Shop Accounting fall the questions of time and wage systems, determination of costs, whether piece or day work, methods of booking, distribution of the various expense accounts, the ascertainment of profits, and all that enters into the system of accounts which relates to the manufacturing departments of a business, and to the determination and record of its results.

One technique to improve both shop management and accounting was the "shop-order system" of tickets and cards. This method was first fully developed in sewing machine companies, which appear to have borrowed it from railroad locomotive shops. It required the plant superintendent to give each order a number and a special set of cards and tickets. The foreman of each shop or subdepartment then recorded the amount of materials and labor used on each order and on each item in that order as it passed through his bailiwick. One copy of the ticket stayed in that shop and a master copy accompanied the order through the remaining departments. A compilation of the copies could permit a review of the materials and labor expended by one shop or department over a specific period. Altogether, this information provided data on prime costs (labor and materials) by product and process. It made possible controls over the flow of goods through the factory and over inventories of raw and semifinished materials. It also permitted managers to evaluate the performance of subunits and the factory as a whole.

In the late 1880s, Henry Towne proposed a plan by which employees as well as owners received the benefits of increased productivity. By this scheme, gains would be shared equally between the company and the workers, with the hands getting 30 to 40 percent of the savings involved and the foreman getting 10 to 20 percent. Modified by another engineer, Frederick Halsey, the plan was adopted in a number of American metalworking plants.

Then Frederick W. Taylor, a self-taught and somewhat eccentric mechanical engineer from the Midvale Steel Company, entered the scene. Taylor (1856-1915) eventually became known as the "father of scientific management." A Philadelphia aristocrat and Harvard dropout, he had gone to the Midvale Steel Company as a laborer in 1878 and was shortly promoted to foreman. Convinced from his experience as a machine operator that his fellow-workers "soldiered" on the job to protect themselves from pressure and rate-cutting, he set out to devise a system of control that would facilitate maximum output per worker and a wage-payment plan that would give incentives to work at maximum speed. Low wages, he asserted, were no assurance of low labor cost. The standard of performance on which he wanted to base his wage rate was the output of "a first-class man in favorable conditions."

To produce favorable conditions was management's responsibility. It involved planning the flow of work, determining the proper methods and tools of each job, and training workers. Job analysis was Taylor's first step in eliminating time lost by a machine operator in "nonproductive" work, such as adjusting the machine and going after materials.

Taylor had earlier instituted at Midvale a shop-order method of control and other systematic ways to raise output. In 1895 he delivered a paper before the American Society of Mechanical Engineers in which he explicitly addressed the gain-sharing plans of Henry Towne and Frederick Halsey. First, he pointed out, such plans erred in basing costs and the resulting savings to be shared on past experience. Instead, they should be based on a standard time and output to be determined "scientifically," through careful job analyses and time and motion studies of the work involved. Taylor also proposed to add the stick to the carrot. Whereas Towne rewarded workers if they exceeded normal output and cut costs, Taylor would also punish by reducing a worker's pay if the standards were not met.

To carry out his plan, Taylor expected to eliminate the shop foreman altogether. He proposed a new planning department which would administer the factory as a whole through a number of highly specialized "functional foremen." Most important, the planning department would set standards of output and do job analyses and time and motion studies. After reviewing orders received at the plant, it would schedule the flow of current orders and set the daily work plan for each operating unit in the factory. In addition, it would refine the shop-order systems of control and keep constant check on "costs of all items manufactured with complete expense analysis and complete monthly comparative cost and expense exhibits." Most important, the planning department would have charge of hiring and firing, thereby displacing the traditional foreman's most powerful function and eliminating nepotism, favoritism, and arbitrary personnel policies.

Such radical changes, however, seldom actually took place in the manner outlined by Taylor. In most of the plants reorganized by practitioners of scientific management, subdepartments continued to be managed by foremen, who remained generalists responsible for the control of throughput in their units. The planning office became the plant manager's staff. New staff offices included those for personnel, accounting, inspection, power and works engineering, product design, methods, production efficiency, and orders. The last was usually responsible for scheduling the flow of materials through the plant, while the department of production efficiency concerned itself with design, with assignments of people (based on time and motion studies) and with setting wages.

After 1900 the most dramatic increases in productivity within the metalworking industries came from improvements in metals used in machine tools and in the increased use of energy. Taylor himself played an important part in intensifying the velocity of production in 1899 when he and an associate developed high-speed steel, an alloy that permitted the cutting of metals at much greater speeds. Such increases in speed, in turn, made possible an even more radical reorganization of shop practices.

By 1895 Taylor had devised his "differential piece-rate" method of wage payment, which he believed would result in maximum output and maximum wages for each worker. Taylor's piece-rate plan was based on time-study of each job. From data collected by use of a stop watch, the time to be allowed for each operation was calculated and a day's task was set. For completing or exceeding the task, a worker received a piece-rate 50 percent higher than if his output fell short of the designated amount. Since the lower differential figures would allow scarcely an ordinary day's pay, the plan was designed to eliminate workers who could not do the assigned daily task, and hold more efficient workers, who could make higher wages under the Taylor plan than anywhere else.

II. Operation of the Taylor System: A Documentary Record

Document #1: *The Government Reviews the Taylor System. Report* of the Chief of Ordnance, U.S. Army, 1913, Appendix I, "The Taylor System of Management at the Watertown Arsenal" (Washington: Government Printing Office, 1913), pp. 60-62.

To the natural inquiry as to what there is new in this, since everybody has always been striving for system and order in manufacturing operations, the answer must be made that the amount of attention which is given under Mr. Taylor's method to system, as evidenced by the number of personnel engaged and the expense involved—that is, by the amount of administrative energy which is devoted to it—is so different from that which has ever anywhere before this time been devoted to systemization as to be absolutely revolutionary.

The second part relates to the quality of output to be obtained from the workman, and the stimulus required to induce him to cheerfully and earnestly and intelligently strive to give the output. This part rests upon the theory that the best and most expeditious way of doing a piece of work is too difficult to ascertain for the workman who has to do it to have any reasonable chance of arriving at it; and that it must be reached through painstaking study, by methods prescribed by a highly skilled and expensive specialist, utilizing measurements of the time required by the various elements of a job, and a great deal of knowledge such as the workman does not have and cannot be expected to have. There is the further theory that the current rate of wages, as it exists in any manufacturing community, is not that corresponding to the best directed and most earnest efforts of the employees, but is that corresponding to the class of performance in connection with which the rate has grown up, which is very far from being the best reasonably and agreeably attainable. By expensively finding out the best method of doing a given piece of work, and the time in which it can reasonably be done by following this method, and then by making it very well worth the employee's while to approach, within a given interval, this time, or to improve upon it, means are found to improve the individual output, and to improve the compensation which is paid for it, in a manner profitable and satisfactory to both employer and employee. . . .

A workman being employed upon a job for which it is intended to set a rate, the time-study man takes his station near him and, openly and with full knowledge upon the part of all concerned of what he is about, proceeds to study the job by first dividing it into its different component movements and periods. He then times carefully each one of the movements and periods, usually more than once. From the data thus obtained he works out what he considers the best sequence of movements and periods, making, if possible, certain elements simultaneous which before were successive, and arrives at a complete program for performing the job and at an estimate of the time in which, by attentively following the program, the job should be completed. This time is called the "task time." It must be understood that the management has theretofore had no definite idea as to the time in which the job should be done, or that it was being done unnecessarily slowly. . . .

After the task time has been arrived at, and it must be remembered that no necessity for unpleasant exertion is admitted in fixing the time, some stimulus in the form of increased pay is given to the workman for meeting this time, or for approaching it. The particular scheme of increase is not important, provided always that it gives an adequate reward for good effort. The scheme applied at the Watertown Arsenal is as follows: The workman is informed that his regular pay is not to be affected. He continues to receive that in any event. The task time is then increased by two-thirds, and he is told that for every minute which he saves within this increased time he will be paid, in

addition to his regular pay, for half a minute, at his regular rate. From this it follows that if he completes the job in exactly the task time the increase in his pay will amount to 33⅓ percent. No limit is placed upon the time in which he can do the work or the extra amount which he can thus earn, and it frequently happens that the task time is bettered, and more than 33⅓ percent extra is earned. . . .

It is the object of the management to have as many men as possible working under the premium system, and effort is made to enable each workman to increase his premiums to the fullest extent. There has been introduced a system of rewarding the foreman by premiums which increase with the proportion of their subordinates who are working upon premium jobs and with the amount of premiums which they earn. So that the foremen are stimulated to assign as many men as possible to jobs on which they can increase their pay in this way, and to help each one of them to the greatest possible increase.

* * * * *

Document #2: *The Taylor System and the Thinking Behind It.* The following selections are from Frederick W. Taylor's book, *The Principles of Scientific Management* (New York: Harper, 1911), pp. 6-9, 13-18, 25, 31-33, 48-52, 83, 94-95, 133, 140. This brief 144-page book, one of the most famous of all management texts, was read and praised by students of business and organization all over the world.

In the past the prevailing idea has been well expressed in the saying that "Captains of industry are born, not made"; and the theory has been that if one could get the right man, methods could be safely left to him. In the future it will be appreciated that our leaders must be trained right as well as born right, and that no great man can (with the old system of personal management) hope to compete with a number of ordinary men who have been properly organized so as efficiently to cooperate. . . . In the past the man has been first; in the future the system must be first. The principal object of management should be to secure the maximum prosperity for the employer, coupled with the maximum prosperity for each employé. . . . maximum prosperity for each employé means not only higher wages than are usually received by men of his class, but, of more importance still, it also means the development of each man to his state of maximum efficiency, so that he may be able to do, generally speaking, the highest grade of work for which his natural abilities fit him.

Underworking, that is, deliberately working slowly so as to avoid doing a full day's work, "soldiering," as it is called in this country, "hanging it out," as it is called in England, "ca canae," as it is called in Scotland, is almost universal in industrial establishments, and prevails also to a large extent in the building trades; and the writer asserts without fear of contradiction that this constitutes the greatest evil with which the working-people of both England and America are now afflicted.

Why is it. . .?

First. The fallacy, which has from time immemorial been almost universal among workmen, that a material increase in the output of each man or each machine in the trade would result in the end in throwing a large number of men out of work.

Second. The defective systems of management which are in common use. . . .

Third. The inefficient rule-of-thumb methods, which are still almost universal in all trades, and in practicing which our workmen waste a large part of their effort.

As engineers and managers, we are more intimately acquainted with these facts then any other class in the community, and are therefore best fitted to lead in a movement to combat this fallacious idea by educating not only the workmen but the whole of the county as to the true facts.

Now, among the various methods and implements used in each element of each trade there is always one method and one implement which is quicker and better than any of the rest. And this one best method and best implement can only be discovered or developed through a scientific study and analysis of all of the methods and implements in use, together with accurate, minute, motion and time study. This involves the gradual substitution of science for rule of thumb throughout the mechanic arts.

However . . . in hardly any element of any trade is there uniformity in the methods which are used. Instead of having only one way which is generally accepted as a standard, there are in daily use, say, fifty or a hundred different ways of doing each element of the work. . . . our methods have been handed down from man to man by word of mouth, or have, in most cases, been almost unconsciously learned through personal observation. Practically in no instances have they been codified or systematically analyzed or described.

It is well within the mark to state that in nineteen out of twenty industrial establishments the workmen believe it to be directly against their interest to give their employers their best initiative . . . they deliberately work as slowly as they dare. . . .

The writer repeats, therefore, that in order to have any hope of obtaining the initiative of his workmen the manager must have some *special incentive* to his men beyond that which is given to the average of the trade. . . . for example, the hope of rapid promotion or advancement; higher wages, either in the form of generous piece-work prices or of a premium or bonus of some kind for good and rapid work; shorter hours of labor; better surroundings. . . and above all, this special incentive should be accompanied by that personal consideration for, and friendly contact with, his workmen which comes only from a genuine and kindly interest in the welfare of those under him.

The writer came into the machine-shop of the Midvale Steel Company in 1878, after having served an apprenticeship as a pattern-maker and as a machinist. This was close to the end of the long period of depression following the panic of 1873. . . . For this reason he was obliged to start as a day laborer instead of working as a mechanic. . . . the clerk of the shop was found stealing. . . . so, having more education than the other laborers (since he had been prepared for college) he was given the position of clerk. Shortly after this he was given work as a machinist. . . . after several months was made gang-boss over the lathes.

. . . The men came to him and talked somewhat as follows:

"Now, Fred, we're very glad to see that you've been make gang-boss. You know the game all right, and we're sure that you're not likely to be a piece-work hog. You come along with us, and everything will be all right, but if you try breaking any of these rates you can be mighty sure that we'll throw you over the fence."

The writer told them plainly that he was now working on the side of the management. . . . This immediately started a war; in most cases a friendly war . . . which as time went on grew more and more bitter.

No one who has not had this experience can have an idea of the bitterness which is gradually developed in such a struggle.

The writer had two advantages. . . .

First, owing to the fact that he happened not to be of working parents the owners of the company believed that he had the interest of the works more at heart than the other workmen, and they therefore had more confidence in his work than they did in that of the machinists who were under him. ...the Superintendent accepted the word of the writer when he said that these men were deliberately breaking their machines as a part of the piece-work war. . . .

Second. If the writer had been one of the workmen, and had lived where they lived, they would have brought such social pressure to bear upon him that it would have been impossible to have stood out against them.

After about three years of this kind of struggling, the output of the machines had been materially increased, in many cases doubled, and as a result the writer had been promoted from one gang-boss-ship to another until he became foreman of the shop. . . . His workman friends came to him continually and asked him, in a personal, friendly way, whether he would advise them, for their own best interest, to turn out more work. And, as a truthful man, he had to tell them that if he were in their place he would fight against turning out any more work, just as they were doing, because under the piece-work system they would be allowed to earn no more wages then they had been earning, and yet they would be made to work harder.

Soon after being made foreman, therefore, he decided to make a determined effort to in some way change the system of management, so that the interests of the workmen and the management should become the same, instead of antagonistic. This resulted, some three years later, in the starting of the type of management which is described in papers presented to the American Society of Mechanical Engineers entitled "A Piece-Rate System" and "Shop Management."

It is only through *enforced* standardization of methods, *enforced* adoption of the best implements and working conditions, and *enforced* cooperation that this faster work can be assured. And the duty of enforcing the adoption of standards and of enforcing this cooperation rests with the *management* alone. . . . The *management* must also recognize the broad fact that workmen will not submit to this more rigid standardization and will not work extra hard, unless they receive extra pay for doing it.

All of this involves an individual study of and treatment for each man, while in the past they have been handled in large groups.

A reward, if it is to be effective in stimulating men to do their best work, must come soon after the work has been done.

This is one of the principal reasons why cooperation or "profit-sharing" either through selling stock to the employés or through dividends on wages received at the end of the year, etc., have been

at the best only mildly effective. . . . A second reason for the inefficiency of profit-sharing schemes had been that no form of cooperation has yet been devised in which each individual is allowed free scope for his personal ambition. Personal ambition always has been and will remain a more powerful incentive to exertion than a desire for the general welfare.

Further than this, in many cases, it is neither right nor just that they should share either the profits or the losses, since these may be due in great part to causes entirely beyond their influence or control, and to which they do not contribute.

As a warning to those who contemplate adopting scientific management, the following instance is given. Several men who lacked the extended experience which is required to change without danger of strikes . . . attempted rapidly to increase the output in quite an elaborate establishment, employing between three thousand and four thousand men. Those who undertook to make this change were men of unusual ability, and were at the same time enthusiasts and I think had the interests of the workmen truly at heart. They were, however, warned by the writer, before starting, that they must go exceedingly slowly, and that the work of making the change in this establishment could not be done in less than from three to five years. This warning they entirely disregarded [with disastrous results].

It is no single element, but rather this whole combination, that constitutes scientific management, which may be summarized as:

Science, not rule of thumb.
Harmony, not discord.
Cooperation, not individualism.
Maximum output, in place of restricted output.

* * * * *

Document #3: *The Taylor System and Worker Incentives.* The following passage is also from Taylor's *Principles of Scientific Management*, pp. 41-47. Taylor believed that this "Story of Schmidt" was a good illustration of how best to improve worker productivity.

One of the first pieces of work undertaken by us, when the writer started to introduce scientific management into the Bethlehem Steel Company, was to handle pig iron on task work. The opening of the Spanish War [1898] found some 80,000 tons of pig iron placed in small piles in an open field adjoining the works. Prices for pig iron had been so low that it could not be sold out of profit, and it therefore had been stored. With the opening of the Spanish-American War the price of pig iron rose, and this large accumulation of iron was sold. This gave us the opportunity to show the workmen, as well as the owners and managers of the works, on a fairly large scale the advantages of task work over the old-fashioned day work and piece work, in doing a very elementary class of work.

The Bethlehem Steel Company had five blast furnaces, the product of which had been handled by a pig iron gang for many years. This gang, at this time, consisted of about 75 men. They were good, average pig iron handlers, were under an excellent foreman who himself had been a pig iron handler, and the work was done, on the whole, about as fast and as cheaply as it was anywhere else at that time.

A railroad switch was run out into the field, right along the edge of the piles of pig iron. An inclined plank was placed against the side of a car, and each man picked up from his pile a pig of iron weighing about 92 pounds, walked up the inclined plank and dropped it on the end of the car.

We found that this gang was loading on the average about 12½ tons per man per day. We were surprised to find, after studying the matter (time study), that a first class pig iron handler ought to handle between 47 and 48 long tons per day instead of 12½ tons. This task seemed to us so very large that we were obliged to go over our work several times before we were absolutely sure that we were right. Once we were sure, however, that 47 tons was a proper day's work for a first-class pig iron handler, the task which faced us as managers under the modern scientific plan was clearly before us. It was our duty to see that the 80,000 tons of pig iron was loaded on to the cars at the rate of 47 tons per man per day, in place of 12½ tons, at which rate the work was then being done. And it was further our duty to see that the work was done without bringing on a strike among the men, without any quarrel with the men, and to see that the men were happier and better contented when loading at the new rate of 47 tons than they were when loading at the old rate of 12½ tons.

Our first step was the scientific selection of the workmen. In dealing with workmen under this type of management, it is an inflexible rule to talk to and deal with only one man at a time, since each workman has his own special abilities and limitations, and since we are not dealing with men in masses, but are trying to develop each individual man to his highest state of efficiency and prosperity. Our first step was to find the proper workman to begin with. We therefore carefully watched and studied these 75 men for three or four days, at the end of which time we had picked out four men who appeared to be physically able to handle pig iron at the rate of 47 tons per day. A careful study was then made of each of these men. We looked at their history as far back as practicable and thorough inquiries were made as the character, habits, and the ambition of each of them. Finally we selected one from among the four as the most likely man to start with. He was a little Pennsylvania Dutchman who had been observed to trot back home for a mile or so after his work in the evening about as fresh as he was when he came trotting down to work in the morning. We found that upon wages of $1.15 a day he had succeeded in buying a small plot of ground, and that he was engaged in putting up the walls of a little house for himself in the morning before starting to work and at night after leaving. He also had the reputation of being exceedingly "close," that is, of placing a very high value on a dollar. As one man whom we talked to about him said, "A penny looks about the size of a cart wheel to him." This man we will call Schmidt.

The task before us, then narrowed itself down to getting Schmidt to handle 47 tons of pig iron per day and making him glad to do it. This was done as follows. Schmidt was called out from among the gang of pig iron handlers and talked to somewhat in this way:

> Schmidt, are you a high-priced man?
>
> Vell, I don't know vat you mean.
>
> Oh yes you do. What I want to know is whether you are a high-priced man or not.
>
> Vell, I don't know vat you mean.
>
> Oh, come now, you answer my questions. What I want to find out is whether you are a high-priced man or one of these cheap fellows here. What I want to find

out is whether you want to earn $1.85 a day or you are satisfied with $1.15, just the same as all these cheap fellows are getting.

Did I vant $1.85 a day? Vas dot a high-priced man? Vell, yes I vas a high-priced man.

Oh, you're aggravating me. Of course you want $1.85 a day--everyone wants it! You know perfectly well that that has very little to do with your being a high-priced man. For goodness sake answer my questions, and don't waste any more of my time. Now come over here. You see that pile of pig iron?

Yes.

You see that car?

Yes.

Well, if you are a high-priced man, you will load that pig iron on that car tomorrow for $1.85. Now do wake up and answer my question. Tell me whether you are a high-priced man or not.

Vell--did I got $1.85 for loading dot pig iron on dot car tomorrow?

Yes, of course you do, and you get $1.85 for loading a pile like that every day right through the year. That is what a high-price man does, and you know it just as well as I do.

Vell, dot's all right. I could load dot pig iron on the car tomorrow for $1.85, and I get it every day, don't I?

Certainly you do--certainly you do.

Vell, den, I vas a high-priced man.

Now, hold on, hold on. You know just as well as I do that a high-priced man has to do exactly as he's told from morning till night. You have seen this man here before, haven't you?

No, I never saw him.

Well, if you are a high-priced man, you will do exactly as this man tells you tomorrow, from morning till night. When he tells you to pick up a pig and walk, you pick it up and walk, and when he tells you to sit down and rest, you sit down, and you don't talk back to him. Now you come to work here tomorrow morning and I'll know before night whether you are really a high-priced man or not.

This seems to be rather rough talk. And indeed it would be if applied to an educated mechanic or even an intelligent laborer. With a man of the mentally sluggish type of Schmidt it is appropriate and not unkind, since it is effective in fixing his attention on

the high wages which he wants and away from what, if it were called to his attention, he probably would consider impossibly hard work.

What would Schmidt's answer be if he were talked to in a manner which is usual under the management of "initiative and incentive?" Say, as follows:

> Now, Schmidt, you are a first-class pig iron handler and know your business well. You have been handling at the rate of 12½ tons per day. I have given considerable study to handling pig iron, and feel sure that you could do a much larger day's work than you have been doing. Don't you think that if you really tried you could handle 47 tons of pig iron per day, instead of 12½ tons?
>
> What do you think Schmidt's answer would be to this?

Schmidt started to work, and all day long, and at regular intervals, was told by the man who stood over him with a watch, "Now pick up a pig iron and walk. Now sit down and rest. Now walk, now rest," etc. He worked when he was told to work, and rested when he was told to rest, and at half-past five in the afternoon had his 47½ tons loaded on the car. And he practically never failed to work at this pace and to the task that was set him during the three years that the writer was at Bethlehem. And throughout this time he averaged a little more than $1.85 per day, whereas before he had never received over $1.15 per day, which was the ruling rate of wages at the time in Bethlehem. That is, he received 60 percent higher wages than were paid to other men who were not working on task work. One man after another was picked out and trained to handle pig iron at the rate of 47½ tons per day until all of the pig iron was handled at this rate, and the men were receiving 60 percent more wages than other workmen around them.

* * * * *

Document #4: *Congressional Testimony on Taylor's Scientific Management.* U.S. Congress, House Special Committee to Investigate the Taylor and Other Systems of Shop Management (1911), *Hearings*, Vol. 3 (Washington: Government Printing Office, 1912), pp. 1386-1389. Under a resolution of August 11, 1911, this special committee was set up to investigate the effects of scientific management plans, especially in government arsenals. Ordnance Department officers, workers, and proponents of scientific management testified at the hearings. The speaker here is Frederick W. Taylor himself:

Scientific management is not any efficiency device, not a device of any kind for securing efficiency; nor is it any bunch or group of efficiency devices. It is not a new system of figuring costs; it is not a new scheme of paying men; it is not a piecework system; it is not a bonus system; it is not a premium system; it is no scheme for paying men; it is not holding a stop watch on a man and writing things down about him; it is not time study; it is not motion study nor an analysis of the movement of men; it is not the printing and ruling and unloading of a ton or two of blanks on a set of men and saying, "Here's your system; go use it." It is not divided foremanship or functional foremanship; it is not any of the devices which the average man calls to mind when scientific management is spoken of. The average man thinks of one or more of these things when he hears the words "scientific management" mentioned, but scientific management is not any of these devices. I am not sneering at cost-keeping systems, at time study, at functional foremanship, nor at any new and improved scheme of paying men, nor at any efficiency devices, if they are really devices that make

for efficiency. I believe in them, but what I am emphasizing is that these devices in whole or in part are not scientific management; they are useful adjuncts to scientific management, so are they also useful adjuncts of other systems of management.

Now, in its essence, scientific management involves a complete mental revolution on the part of the working man engaged in any particular establishment or industry—a complete mental revolution on the part of these men as to their duties toward their work, toward their fellow man, and toward their employers. And it involves the equally complete mental revolution on the part of those on the management's side—the foreman, the superintendent, the owner of the business, the board of directors—a complete mental revolution on their part as to their duties toward their fellow workers in the management, toward their workmen, and toward all of their daily problems. And without this complete mental revolution on both sides scientific management does not exist.

That is the essence of scientific management, this great mental revolution. . . .

I think it is safe to say that in the past a great part of the thought and interest both of the men, on the sides of the management, and of those on the side of the workmen in manufacturing establishments has been centered upon what may be called the proper division of the surplus resulting from their joint efforts, between the management on the one hand, and the workmen on the other hand. The management have been looking for as large a profit as possible for themselves, and the workmen have been looking for as large wages as possible for themselves, and that is what I mean by the division of the surplus. Now, this question of the division of the surplus is a very plain and simple one (for I am announcing no great fact in political economy or anything of that sort). Each article produced in the establishment has its definite selling price. Into the manufacture of this article have gone certain expenses, namely the cost of materials, the expenses connected with selling it, and certain indirect expenses, such as the rent of the building, taxes, insurance, light and power, maintenance of machinery, interest on the plant, etc. Now, if we deduct these several expenses from the selling price, what is left over may be called the surplus. And out of this surplus comes the profit to the manufacturer on the one hand, and the wages of the workmen on the other hand. And it is largely upon the division of this surplus that the attention of the workmen and of the management has been centered in the past. . . .

The great revolution that takes place in the mental attitude of the two parties under scientific management is that both sides take their eyes off the division of the surplus as the all-important matter, and together turn their attention toward increasing the size of the surplus until this surplus becomes so large that it is unnecessary to quarrel over how it shall be divided. They come to see that when they stop pulling against one another, and instead both turn and push shoulder to shoulder in the same direction, the size of the surplus created by their joint efforts is truly astounding. They both realize that when they substitute friendly cooperation and mutual helpfulness for antagonism and strife they are together able to make this surplus so enormously greater than it was in the past that there is ample room for a large increase in wages for the workmen and an equally great increase in profits for the manufacturer. This, gentlemen, is the beginning of the great mental revolution which constitutes the first step toward scientific management . . . .

There is, however, one more change in viewpoint which is absolutely essential to the existence of scientific management. Both sides must recognize as essential the substitution of exact scientific investigation and knowledge for the old individual judgment or opinion, either of the workman or the boss, in all matters relating to the work done in the establishment. And this applies both as to the methods to be employed in doing the work and the time in which each job should be done.

Taylor's Definition of a First-Class Worker

Now, what I mean by "first-class" men is set before you by what I mean by first-class horses. I mean that there are big, powerful men suited to heavy work, just as dray horses are suited to the coal wagon, and I would not use a man who would be first class for this heavy work to do light work for which he would be second class, and which could be just as well done by a boy who is first class for this work, and vice versa. What I want to make clear is that each type of man is first class at some kind of work, and if you will hunt far enough you will find some kind of work that is especially suited to him. . . .

Among the first-class big dray horses that are hauling coal wagons you will find a few of them that will balk, a few of them that can haul, but won't haul. You will find a few of these dray horses that are so absolutely lazy that they won't haul a coal wagon. And in the same way among every class of workmen we have some balky workmen—I do not mean men who are unable to do the work, but men who, physically well able to work, are simply lazy and who through no amount of teaching and instructing and through no amount of kindly treatment, can be brought into the first class. That is the man whom I call "second class." They have the physical possibility of being first class, but they obstinately refuse to do so.

The Chairman: Scientific management has no place for such men?

Mr. Taylor: Scientific management has no place for a bird that can sing and won't sing.

The Chairman: We are not in this particular investigation dealing with horses nor singing birds, but we are dealing with men who are a part of society and for whose benefit society is organized; and what I wanted to get at is whether or not your scientific management had any place whatever for a man who was not able to meet your own definition of what constitutes a first-class workman.

Mr. Taylor: Exactly. There is no place for a man who can work and won't work.

The Chairman: It is not a question of a man who can work and won't work; it is a question of a man who doesn't meet your definition of first-class workmen. What place have you for such men?

Mr. Taylor: I believe the only man who does not come under first class as I have defined it, is the man who can work and won't work. I have tried to make it clear that for each type of workman some job can be found at which he is first class, with the exception of those men who are perfectly well able to do the job, but won't do it.

The Chairman: Do you mean to tell the committee that society is so well balanced that it just provides the proper number of individuals who are well fitted to a particular line of work to furnish society with the products of that line of work?

Mr. Taylor: Certainly not, Mr. Chairman. There is not a fine balance in society. It is sometimes difficult to find jobs right near home for which men are well suited, that is, for which they are first class. There is an immense shortage of men, however, who are needed to do the higher classes of work. There always has been and always will be, an immense shortage near the top. It is not so great down below, but at the top there is an immense shortage of first-class men, so that there is plenty of room for men to move up.

The Chairman: If society does not produce an equal balance in all the lines of production of first-class men, must there not of necessity be some men who are not first class in any particular line of work where they can secure employment?

Mr. Taylor: I do not think there is any man, so far as I know, who is physically fitted for work, who in this country has to go without work in ordinary times. I do not know of this case except in very dull times.

* * * * *

Document #5: *Frank B. Gilbreth, Another Leading Consultant.* Gilbreth (1868-1924) developed his ideas on improved individual efficiency before he met Taylor, but his work came closer to Taylor's when he extended his investigations into methods of general management. Gilbreth used motion study as a means of eliminating ineffective expenditure of energy. In addition to the stopwatch, he employed a movie camera to provide material for analysis of a worker's movements (micromotion study) and courses of fatigue. Gilbreth was immortalized in a hilarious best-selling book, *Cheaper by the Dozen*, written by two of his twelve children. In the 1950s, the book was made into a very successful Hollywood film. The following selection summarizes the Taylor and Gilbreth systems. It is from Milton J. Nadworny, "Frederick Taylor and Frank Gilbreth: Competition in Scientific Management," *Business History Review*, Vol. 31, No. 1 (Spring 1957), p. 27.

In 1912 Gilbreth devised and began to use a technique of work measurement which he called "micromotion study," which employed a motion picture camera to record the performance of a worker on a job, with a clock calibrated in hundredths of a minute placed in viewing range. With this technique, Gilbreth could record the motions, the time, and the conditions surrounding the job. [He called each unit of motion a "therblig," which is (almost) "Gilbreth" spelled backwards.] His major objective was the recording, and ultimate simplification and improvement of the motions of the worker. His method permitted him to time both the motions of the worker and the total job, and also provided an opportunity to reproduce the performance of the worker a relatively unlimited number of times. Gilbreth subsequently devised other schemes of recording and tracing worker motions, but he considered micromotion study to be his most important contribution to scientific management.

Work measurement was, of course, one of the most significant aspects of scientific management. The Taylor program was based on the use of stop watch time study, under which the time study technician determined what the "elements" of a particular job were, and took a number of stop watch readings of each of the elements in developing data from which the ultimate time standard for the job would be developed. Taylor, himself, considered time study to be the "foundation of scientific management," and the Taylorites were primarily interested in the timing of the job. While Gilbreth was, of course, vitally interested in establishing a standard time for the job, he was perhaps more interested in analysis of work methods and patterns and in achieving economy of motions and effort, and he therefore viewed the setting of work standards from a different point of view. It is therefore not surprising that when Gilbreth described his new technique to the scientific management leader, the reaction was something less than enthusiastic. "Showed micromotion to Taylor," he noted, "and told him what it would do and told him I was surprised that he did not recognize its meaning. He said it was undoubtedly good where one was investigating the minutia of motions. He acted so that I saw he was hurt and so I changed the subject. . . ."

The Gilbreths [Frank and Eleanor, his wife and partner] characterized time study as unethical, wasteful, and inaccurate, among other things, although they were careful to point out that they were

not personally criticizing Frederick Taylor, "the great founder of stop watch time study." (It would, however, have been strange indeed if their audience, and readers of the Taylor Society *Bulletin*, did not construe their strongly adverse criticism of time study to be an attack upon Taylor himself, because the most popular symbol of the latter's program was the stop watch.) The Gilbreths' essential contentions were that time study did not "preserve the best that has been done," employed questionable statistical methodology in arriving at standard times, and was costly because of the inaccurate and useless data it developed. They took pains to point out that motion study was not the same as time study, nor "a part of time study," and denounced the developers and practitioners of time study for failing to "cooperate with motion study." . . .

What has happened in the field of work measurement is that an accommodation has taken place, and both stop watch time study and motion study and its derivatives are used, either by individual firms or within the same work measurement program. It is, in a sense, a triumph for the Gilbreths and particularly Frank Gilbreth, who, long ago, suggested to Taylor that motion study "should really go with your great invention of time study." It was not, of course, the kind of economic or intellectual triumph that Gilbreth might have desired in 1921, but rather a process of gradually increasing cooperation between the techniques and their representative practitioners, his more consistently sought goal. No doubt the absence of the leading antagonists and competitors expedited the process of accommodation.

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Document #6: *A Government Evaluation of Scientific Management.* From U.S. Commission on Industrial Relations of 1912, *Final Report and Testimony*, (Washington: Government Printing Office, 1912) Vol. I, pp. 136-138.

To sum up, scientific management in practice generally tends to weaken the competitive power of the individual worker and thwarts the formation of shop groups and weakens group solidarity; moreover, generally scientific management is lacking in the arrangements and machinery necessary for the actual voicing of the workers' ideas and complaints and for the democratic consideration and adjustment of grievances. Collective bargaining has ordinarily no place in the determination of matters vital to the workers, and the attitude toward it is usually tolerant only when it is not understood. Finally unionism, where it means a vigorous attempt to enforce the viewpoint and claims of the workers, is in general looked upon with abhorrence, and unions which are looked upon with complacency are not the kind which organized labor in general wants, while the union cooperation which is invited is altogether different from that which they stand ready to give. In practice scientific management must, therefore, be declared autocratic in tendency—a reversion to industrial autocracy, which forces the workers to depend on the employers' conception of fairness and limits the democratic safeguards of the workers.

The arbitrary will of the employer and the law of economy are two potent special forces which contribute to the existing diversity, incompleteness, and crudity of scientific management as it is practiced, even where the systematizer is possessed of the highest intelligence and imbued with the best motives of his group.

But to explain the situation as it exists at present, two other important factors must be taken into consideration. The first of these is the existence and practice of self-styled scientific management systematizers and time study experts who lack in most respects the ideals and the training essential to fit them for the work which they claim to be able to do. Scientific management as a movement

is cursed with fakirs. The great rewards which a few leaders in the movement have secured for their services have brought into the field a crowd of industrial "patent medicine men." The way is open to all. No standards or requirements, private or public, have been developed by the application of which the goats can be separated from the sheep. Employers have thus far proved credulous. Almost anyone can show the average manufacturing concern where it can make some improvements in its methods. So the scientific management shingles have gone up all over the country, the fakirs have gone into the shops, and in the name of scientific management have reaped temporary gains to the detriment of both the employers and the workers.

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Document #7: *Continuing Objections by Workers 27 Years after Taylor's Death.* From U.S. Bureau of Labor Statistics, *Bulletin* No. 717, "Incentive-Wage Plans and Collective Bargaining" (Washington: Government Printing Office, 1942), pp. 2, 6-7.

In the early days of the factory system, piecework was common only in such industries as clothing and textile manufacture. These industries had their beginnings in home work, the worker being paid by the bundle for completed or semicompleted work. When the work was transferred to the factory, it was divided into many operations, making possible a further refinement in the incentive system. In the majority of early industrial establishments, however, piecework was not applied, because the tasks to be performed were extremely varied and required workers of higher all-round skill than was possessed by the more specialized pieceworker. . . .

The introduction of complex incentive methods in conjunction with scientific-management techniques was a significant feature of the decade following the first World War. The rapid growth of such industries as the manufacture of automobiles and of electrical products, which were characterized by frequent style and model changes and continuous improvement in process and equipment, made necessary more detailed attention to production and efficiency problems. The time-study staff became a regular part of large factory operations. Many companies, both large and small, hired outside engineers, each of whom had developed his own particular type of incentive system.

The installation of some of these plans was accompanied by thorough reorganization of factory production along more efficient lines, with the result that the incentive system increased production and earnings without marked increase in work effort on the part of the employees. In other cases, incentive systems were imposed on existing inefficient management methods, and such savings as were made in labor cost resulted only from speeding up the workers. No matter how thorough the original installation, inequities and confusion frequently developed after the engineer departed and the local management was left to carry on a complicated system, the essentials of which were only faintly understood in some cases.

In computing workers' pay for their output, the more complex incentive systems make use of formulas that are confusing to most of the workers. The pay is not calculated according to the mere number of pieces produced or the number of hours of work but by means of some special unit such as a "manit" or a "B-hour." Workers claim that the use of a complex formula for wage payment facilitates rate cutting, because actual changes in production standards which affect the unit of measurement may be concealed from them. Whether rate cutting occurs or not, the worker finds it difficult to check the relationship between his pay and his output or effort. Thus, while simple piece rates are often accepted by workers as logical and necessary, the more complicated bonus and

premium plans, with their mathematical formulas for determining the workers' earnings, are likely to arouse deep suspicion.

A form of automatic rate cutting takes place in the "decreasing earnings curve" which is an essential part of the so-called "gain-sharing" incentive systems. Inherent in the formulas by which earnings are computed under these plans is the principle that the reward shall be in a decreasing ratio for increased output. These incentive systems are referred to as "gain sharing," because a part of the value of the workers' increased production above "task" is retained by management for efficient supervision and efficient working conditions which theoretically helped make possible the increased output. Naturally enough, workers do not understand the complicated theories behind such sharing of gains between management and labor for increased output, and often refer to the decreasing earnings curve as the "take-away curve."

Underlying the workers' fear and suspicion of rate cutting is their objection and uneasiness over a purely "scientific" approach to their jobs. Workers claim that almost any job contains elements which cannot be evaluated by the quantitative, stop-watch technique. They point to unpredictable variations in the quality of materials, in working equipment, and in other conditions surrounding their jobs. They know that every time study is adjusted to include "allowances" for delay, fatigue, and personal time which are arbitrarily determined. They are conscious of the fact that each of the job elements measured by the stop watch is evaluated by the time-study expert on the basis of his judgment as to whether the worker being timed is a slow, fast, or average worker.

Basically, the workers' grievances against scientific management, especially as practiced in the early days, are attributable to the tendency of management engineers to consider labor as impersonal and as a part of the machine process. Workers feel that they are being treated as abstract "labor," rather than human beings at work, when engineers break down jobs into repetitive operations, study work methods to discover short cuts and more efficient routines, shorten the cycle of operations which each workman is allowed to perform, and emphasize financial rewards instead of creative workmanship as an incentive towards efficient production.

Workers' objections to "scientific" wage setting may be alleviated or enhanced by management's approach to the time-study problem. In some plants, no one may become a member of the time-study staff who has not had years of working experience on regular production. In many instances, however, time-study "experts" are employed who have no first-hand familiarity with the jobs they are investigating. The "scientific" determination of working methods and standards by such persons is viewed with suspicion and distrust by workers on the job. Moreover, the impersonal treatment which workers resent is likely to be accentuated when an outside engineering firm is engaged to install an incentive plan. Such a firm is not subject to the controls of personal friendship and community interest which may influence a local plant management.

Workers are particularly opposed to the practices, formerly in widespread use, of employing secret or concealed time studies, or of placing "pace setters" in a department temporarily to get fast timings. These are viewed as instances of employer "cheating" on incentive workers, and they increase the hostility of workers toward all time-study methods.

As noted previously, the more complicated the incentive system, the more opposition it arouses in the workers. To many workers, the very "scientific" nature of the job standards under the complex plans appear merely another means of concealing form them the rate cuts and speed-up of which they complain. Although disagreement over piece rate, bonus rate, or production standard may

represent simply a difference of opinion as to what constitutes "a fair day's work for a fair day's pay," the question is often complicated by management's conviction that the workers will not accept facts proved by scientific study and by the workers' feeling that, while they are not able to disprove management's technical case, they know their own jobs and believe that "the rates are not right."

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12

WHARTON REPROGRAPHICS

Organized Labor and the Worker (Abridged)

Background

It is not easy to discuss "the worker" prior to large-scale industrialization in the United States, because the very idea that there should be a category of individuals who worked for others and whose purview and interests should be determined by that situation over a lifetime or even an extended period was not universally accepted. An important part of American ideology was that an individual did not have to labor for others, at least not for one's entire life. Further, it was widely believed that relations between those who supplied manual labor and those who provided work were and should be characterized by a "harmony of interests." A well-known lawyer and publicist during the time of Andrew Jackson explained that "Society . . . is divided into two classes—those who do something for their living and those who do not. All honest men," he held, "belong to one party because they have all pure intentions and a common object—the greatest good of the greatest number."[1] Included in this lawyer's definition of working people were, among others, Newton, Franklin, Washington, and Shakespeare.

Ideology, of course, is rarely a precise descriptor of reality (although in this case it does indeed describe an important tendency). Prior to the Civil War, one can delineate a working class with a number of components.

First, of course, were the slaves. There were almost four million living in the United States. A voluminous literature on this subject demonstrates that it would be a gross distortion to depict masters as unfettered actors and slaves as purely acted upon. It is, however, reasonably accurate to say that at law the slave had little control over the terms of his or her labor or domestic living arrangements.

Second, in major cities there were artisans who were organized along lines similar to the guild system of Europe. These artisans included printers, shoemakers, coopers, and others who supplied the needs of urban residents and business people. At their head were the masters who determined who would be admitted to the trade, what items would be produced, and what prices

Professor Richard S. Tedlow prepared this case as the basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation. Professor Thomas K. McCraw abridged the case and revised it slightly.

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1. Marvin Meyers, *The Jacksonian Persuasion* (Stanford, 1960), pp. 215-216.

would be charged. Masters were assisted by journeymen who shared in their income and by apprentices who received room and board in exchange for learning the trade.

Third, there were also clustered in major cities casual laborers. These individuals performed unskilled manual labor such as dock work. They were employed irregularly and were often transients.

In the antebellum period, labor organizations developed within artisan ranks. By 1830, associations of shoemakers, printers, and other crafts had been formed in Boston, Baltimore, Philadelphia, New York, and Pittsburgh. These early union-like organizations were restricted to a particular trade or craft and were local. Their aims included the upholding of standards, the restriction of hours of work, and better pay. They also served as benevolent societies that came to the aid of members in case of unemployment or illness. To achieve their goals, these organizations bound their membership to strict rules and made use of the strike when necessary.

One authority has written:

> Although the early unions sought aims familiar to modern trade unionists, they practiced a singular form of bargaining. Rather than sit across a table from their employers and discuss the terms and conditions of employment, the craftsmen simply drew up a list of their demands, posted it publicly, and waited for the employer to accept or reject it. Acceptance would produce a settlement; rejection, a strike.[2]

Before the Civil War (1861-65), a number of developments foreshadowed modern labor organization. First, unions began to take political stands and even founded labor parties as early as 1828 in major cities. Second, they developed national organizations. Third, they made vigorous use of the strike.

The problems unions faced prior to the Civil War were also similar in some respects to those of a later era. For one thing, there was the law. The legality of strikes was questionable because of the doctrine that they constituted conspiracies in restraint of trade, in violation of the common law. Thus the Philadelphia Cordwainers' Conspiracy case (1806) held that one shoemaker could withhold labor but two or more could not jointly do so. The legality of the strike was not established until the case of *Commonwealth v. Hunt* in 1842, and even then it was not an open-and-shut issue.

Another problem was that labor organizations were acutely susceptible to economic conditions. Periodic business panics and depressions often forced workers to choose between keeping their union membership or keeping their job. Even more important, domestic geographic mobility and immigration tended to loosen local union ties. Foreign immigration into the United States from 1820 to 1860 totaled:

1820-1829 :	128,452
1830-1839 :	538,381
1840-1849 :	1,427,337
1850-1859 :	2,814,554

2. Melvyn Dubofsky, "Labor," in Glenn Porter, ed., *Encyclopedia of America Economic History*, Vol. II (New York, 1980), pp. 525-526.

Relative to the total population, these were very large numbers, and immigration had an especially strong impact on American cities. By 1860, 48% of New Yorkers, 50% of Chicagoans and Pittsburghers, and 60% of St. Louisians were foreign born. In this early period, most immigrants were British, Irish, or German.

The Civil War and Postwar Developments

With the waning of the Panic of 1857, even before the Civil War broke out, the nation saw increased labor organizing activity. In response to cutthroat competition among manufacturers of cast iron stoves in 1859, various local unions combined to form the Iron Molders International Union. Also preceding the war were national or regional organizations of printers, hat finishers, stone cutters, cigar makers, machinists, and blacksmiths. Many of these organizations were founded before the Panic of 1857. Having proven capable of surviving it, they grew stronger during the war years.

The war generated sharply higher prices, with wages lagging behind. However, it also resulted in labor shortages, which led to increased union membership and power. The first of the railway brotherhoods (for locomotive engineers) came into existence in 1863, followed by brotherhoods for conductors (1868) and firemen (1873). Later on, these railroad unions proved unusually powerful because the industry was so important and because, in the case of engineers and conductors, a strike by relatively few people could actually stop the trains from running.

Shoemakers, in response to the displacement of skilled workers by the unskilled tending newly introduced machinery, formed the Knights of St. Crispin, which by 1870 was the largest national craft union, with 50,000 members. In all, perhaps as many as 300,000 American workers were unionized by 1870.

Some of the craft unions appear to have been tightly organized and effectively managed. In the case of the printers,

> control of the organization became centralized in a general executive board consisting of well-paid national officials with substantial expense accounts and office staffs; the union levied relatively high dues in order to amass strike funds and disburse welfare benefits to its members; in return for strike payments and welfare benefits, local unions surrendered the right to call strikes to national officers. Finally, because the printing trades operated primarily in a local market situation and competition was more common between workers than employers, the union issued traveling cards that promoted craft solidarity and curtailed scabbing.[3]

In 1866, a convention of trade unions and reform societies met to establish a federation of national unions. The resultant organization, the short-lived National Labor Union, welcomed both skilled and unskilled workers. It established a lobby in Washington and agitated for the eight-hour day, the granting of lands in the public domain to individuals only (rather than to corporations), and women's rights. It also supported arbitration and favored the formation of worker-owned cooperatives. But it opposed strikes.

3. Dubofsky, "Labor Organizations," p. 530.

The NLU's leader, until his death at the age of 41 in 1869, was William Sylvis of the Iron Molders. In 1868, Silvis wrote to Karl Marx on the occasion of the First International:

> Our cause is a common one . . . . Go ahead in the good work you have undertaken, until the most glorious success crowns your efforts . . . moneyed power is fast eating up the substance of the people. We have made war upon it, and we mean to win it. If we can we will win through the ballot box; if not, we will resort to sterner means. A little bloodletting is sometimes necessary in desperate cases.[4]

At its height, the NLU had about 170,000 members. By the early 1870s, it began to concentrate largely on controversial political goals. It backed a candidate in the 1872 presidential election, but he turned his back on it and the result was acute embarrassment. By this time the stronger trade unions had begun to leave the NLU in the hands of a motley group of radicals: "labor leaders without organizations, politicians without parties, . . . and cranks, visionaries, and agitators without jobs."[5] The dreadful depression of 1873 wiped out the NLU as well as most all of the 30-odd trade unions founded in the 1860s.

The Knights of Labor

Among the organizations that did survive the depression was the Noble Order of the Knights of Labor. The Knights had its beginnings as an organization of garment cutters in Philadelphia. It adopted the ritual paraphernalia often popular among fraternal organizations of the day. "To ensure secrecy the order was never referred to by name; it was known as the Five Stars or the Five Asterisks. Its meetings were called by mysterious symbols chalked on fences and sidewalks; its members were supplied with grips, passwords, and countersigns."[6] At first it was concerned with the usual issues of craft unionism, but with its new Grand Master Workman, Terence V. Powderly, the Knights attempted to transform itself into a national organization. The basic approach was to welcome everyone, regardless of race, gender, or skill (with the exception of "parasitic" professions such as liquor dealers, gamblers, stockbrokers, lawyers, and bankers). The goal, in the words of one labor historian, was "to teach the American wage earner that he was a wage earner first and a bricklayer, carpenter, miner, shoemaker after; that he was a wage earner first and a Catholic, Protestant, Jew, white, black, Democrat, Republican after . . . "[7] Membership in the Knights of Labor was approximately as follows (in thousands):

1879:	9	1885:	104
80:	20	86:	703
81:	28	87:	510
82:	19	88:	260
83:	42	89:	220
84:	52	90:	100

4. Quoted in Melvyn Dubofsky, *Industrialism and the American Worker* (New York, 1957), p. 53.
5. Norman Ware, *The Labor Movement in the United States, 1860-1895* (New York, 1929), p. 11.
6. Joseph G. Rayback, *A History of American Labor* (New York, 1966), p. 143.
7. Norman Ware, *Labor Movement*, p. xviii.

The dramatic increase in 1886 derived from a spectacularly successful strike against a wage cut Jay Gould attempted to impose on three of his railroads. The walkout was spontaneous, but the Knights supported it. Gould was in an exposed position at this time and gave in to the workers' demands almost immediately. The decline of the Knights can be explained by the complete failure of another strike against Gould, the failure of a strike for the eight-hour day, and the riot at a meeting of radicals at Chicago's Haymarket Square in 1886, which led to widespread antilabor opinion. **Exhibit 1** is a speech by the Knight's Grand Master Workman Powderly in 1880, and **Exhibit 2** is a declaration of aims of the Knights in 1884. Together these documents provide a summary of the goals and philosophy of the organization.

The American Federation of Labor

Founded in 1886 from the ashes of the moribund Federation of Organized Trades and Labor Unions of the United States and Canada, the A F of L was destined to become the most important voice of labor for a half century. A leading reason for its success was the character of Samuel Gompers, who served continuously as its president (with the exception of one year) from its founding to his death in 1924.

Gompers, a Jew of Dutch descent born in London in 1850, migrated to New York with his family in 1863. He was a cigar maker by trade:

> Cigar rolling was quiet work, and the men used this advantage by assigning one of their number as reader, sharing their product with him so that he suffered no loss of income. The readers roamed far and wide across the aesthetic, political, and economic literature of the time and sampled the current newspapers and magazines. After the readings, the workers engaged in lively, sometimes heated discussions contributing significantly to "the fellowship that grew between congenial shopmates which was something that lasted a lifetime." For Sam, "life in the factory," which proved a Hogarthian nightmare for many, remained "one of [his] most pleasant memories."[8]

By 1875 Gompers was a union organizer, knocking on the doors of shops and tenements and writing pamphlets in English and German after working a ten-hour day. The depth of his commitment is indicated by the fact that in his later years he could not remember whether he had had ten or twelve children. Gompers participated fully in the lively New York intellectual ferment of these years, and he learned a lot from socialists, communists, and reformers of the day. As he saw it, his foremost lesson was that such people had no business in the labor movement. He favored "pure and simple" unionism of, by, and for workers themselves. He opposed ideologies, ideologues, and politics. Samples of Gompers' views are presented in **Exhibit 3.** Membership figures for the A F of L appear in **Exhibit 4.**

By the turn of the century, Gompers had won a seat at the banquet of the mighty as the spokesman for "responsible" organized labor. He was a member of the National Civic Federation, an organization founded in 1900 to promote industrial harmony. Here he hobnobbed with such luminaries as the steel titan Andrew Carnegie and the investment banker August Belmont.

8. Harold C. Livesay, *Samuel Gompers and Organized Labor in America* (Boston, 1978), p. 13.

President Woodrow Wilson, of whom Gompers was an ardent supporter, appointed him to the Council on National Defense during World War I.

Industrial Unions

Between 1890 and 1920, a number of organizations sprang up which rejected the strict craft union/skilled worker bias of the A F of L. Some of these new organizations campaigned in favor of "one big union," which would include all workers in an industry regardless of the work they performed. Within the A F of L, one major affiliate had this "industrial union" structure. This was the United Mine Workers.

Dispersed in small towns, the miners found the craft approach impractical. Their hardbitten and shrewd leadership masterminded important advances against the mine owners, and their membership grew from about 63,000 in 1899 to about 270,000 in 1907. But Samuel Gompers remained suspicious of the miners' tactics and felt threatened by the UMW's power within the A F of L. The only year between 1886 and 1924 that he lost the presidency of the Federation was in 1895; the victor was from the UMW.

One of the leading industrial union advocates was the talented, passionate Eugene Victor Debs. Coming from a middle-class background, Debs became an official of the Brotherhood of Railway Firemen in the 1870s. He started his career as a conservative, opposing the railway strikes of 1877. But by the early 1890s, he had become convinced that craft unions could not to cope with the new economic juggernaut of Big Business. In June of 1893, Debs founded the American Railway Union along industrial lines, with power and control vested in a central organization. Soon thereafter, unorganized workers on the Great Northern, a major railroad, struck against a wage cut and appealed to Debs' union for help. The ARU responded, and its unexpectedly quick victory brought a sudden jump in membership. In one year alone, the ARU attracted 150,000 new members.

In 1894, however, the union was drawn unwillingly into another strike, this one in sympathy with employees of the Pullman Palace Car Company. George Pullman was a tough customer, and he was supported by a powerful organization of railway executives. With the help of federal and state troops and the vigorous use of court injunctions, the Pullman strike was completely crushed in July of 1894, after rioting and loss of life. The Pullman strike was a major event in the history of unionism in America. Its failure became a bitter symbol for many working people. Debs himself was jailed. During his incarceration, he became a socialist. Over the next two decades, he ran as socialist candidate for president on five occasions. In 1912, he won about 6% of the popular vote (901,000), a higher percentage than any other socialist candidate before or since. In 1920, he received over 920,000 votes while in a jail cell for having spoken out against World War I in June of 1918.

One other important industrial union, the Industrial Workers of the World, was founded in 1905 by a group of radical leftists committed to organizing the mass of unskilled workers. From 1909 to 1919, the IWW was at the center of almost a dozen violent industrial conflicts, gaining some notable successes. The IWW was not just an industrial union, but a radical cadre that preached seizure of the nation's productive assets by direct worker action in factory and even farm. The IWW was crushed by business and government soon after World War I.

Exhibit 1 Speech by Terence W. Powderly, Grand Master Workman of the Knights of Labor, September 1880

One of the evils which beset the trades union, and which ever and anon comes to the surface in this organization, is the strike. . . .

Many of our Locals have spent a great deal of valuable time in discussing the best means of supporting their Brethren in that most disastrous of all methods of obtaining a redress of grievances,-the **Strike.**

Do not, I beg of you, fall into the same error, but endeavor to direct every effort toward the perfection of measures for the destruction of the evils which make strikes a necessity. . . .

So long as a pernicious system leaves one man at the mercy of another, so long will labor and capital be at war, and no strike can hit a blow sufficiently hard to break the hold with which unproductive capital today grasps labor by the throat.

In what direction should we turn to see our way clear to a solution of the difficulty? Far be it from me to say that I can point the way; would to Heaven that I could with certainty do it! I can only offer a suggestion, which comes to me as the result of experience, and that suggestion is to abolish the Wage System. . . .

This is the system which enables a half a dozen men to sit at their tables in any of our large centres of trade, and, without any thought of the welfare of the country, issue the imperial mandates which direct the movements of the whole industrial population of the United States.

This is the system which makes every railroad superintendent, every factory or mine superintendent, an autocrat, at whose nod or beck the poor unrequited slave who labors must bow the head and bend the knee in humble suppliance. . . .

We must teach our members, then, that the remedy for the redress of the wrongs we complain of does not lie in the suicidal strike; but it lies in thorough, effective organization. Without organization we cannot accomplish anything; through it we hope to forever banish that curse of modern civilization—wage slavery.

But how? Surely not by forming an association and remaining a member; not by getting every other worthy man to become a member and remain one; not by paying the dues required of us as they fall due. These are all important factors in the method by which we hope to regain our independence, and are vitally important—they are the elements necessary to a complete organization.

Organization once perfected, what must we do? I answer, study the best means of putting your organization to some practicable use by embarking on a system of cooperation which will eventually make every man his own master,—every man his own employer; a system which will give the laborer a fair proportion of the products of his toil. It is to cooperation, then, as the lever of labor's emancipation, that the eyes of the workingmen and women of the world are directed, upon cooperation their hopes are centred, and to it do I now direct your attention. I am deeply sensible of the importance, of the magnitude, of the undertaking in which I invite you to engage.

I know that it is human nature to grow cold, apathetic, and finally indifferent, when engaged in that which requires deep study and persistent effort, unattended by excitement; men are apt to believe that physical force is the better way of redressing grievances, being the shorter remedy; but even that requires patience and fortitude as well as strength. I need but point out to you the war of the Revolution, which took nearly eight years of hard fighting and persistent effort upon the part of men who fought for a principle. Had these men fallen into the same error which Labor has so often fallen into, there would be no independence; had they gone to their homes after the battle of Bunker Hill, there would be no Bunker Hill monument erected, even though the result of that battle was encouraging. . . .

The laboring man needs education in this great social question, and the best minds of the Order must give their precious thought to this system. There is no good reason why labor cannot, through cooperation, own and operate mines, factories, and railroads.

Source: HBS Case No. 372-319.

Exhibit 2 Preamble and Declaration of Aims of the Knights of Labor (1884)

The alarming development and aggressiveness of great capitalists and corporations, unless checked, will inevitably lead to the pauperization and hopeless degradation of the toiling masses.

It is imperative, if we desire to enjoy the full blessings of life, that a check be placed upon unjust accumulation, and the power for evil of aggregated wealth.

This much-desired object can be accomplished only by the united efforts of those who obey the divine injunction, "In the sweat of thy face shalt thou eat bread."

Therefore we have formed the Order of Knights of Labor, for the purpose of organizing and directing the power of the industrial masses, not as a political party, for it is more - in it are crystallized sentiments and measures for the benefit of the whole people, but it should be borne in mind, when exercising the right of suffrage, that most of the objects herein set forth can only be obtained through legislation, and that it is the duty of all to assist in nominating and supporting with their votes only such candidates as will pledge their support to those measures, regardless of party. But no one shall, however, be compelled to vote with the majority, and calling upon all who believe in securing "the greatest good to the greatest number," to join and assist us, we declare to the world that our aims are:

I. To make industrial and moral worth, not wealth, the true standard of individual and national greatness.

II. To secure to the workers the full enjoyment of the wealth they create, sufficient leisure in which to develop their intellectual, moral and social faculties: all of the benefits, recreation and pleasures of association; in a word, to enable them to share in the gains and honors of advancing civilization.

In order to secure these results, we demand at the hands of the State:

III. The establishment of Bureaus of Labor Statistics, that we may arrive at a correct knowledge of the educational, moral and financial conditions of the laboring masses.

IV. That the public lands, the heritage of the people, be reserved for actual settlers; not another acre for railroads or speculators, and that all lands now held for speculative purposes be taxed to their full value.

V. The abrogation of all laws that do not bear equally upon capital and labor, and the removal of unjust technicalities, delays and discriminations in the administration of justice.

VI. The adoption of measures providing for the health and safety of those engaged in mining, manufacturing and building industries, and for indemnification to those engaged therein for injuries received through lack of necessary safeguards.

VII. The recognition, by incorporation, of trades' unions, orders and such other associations as may be organized by the working masses to improve their condition and protect their rights.

VIII. The enactment of laws to compel corporations to pay their employees weekly, in lawful money, for the labor of the preceding week, and giving mechanics and laborers a first lien upon the product of their labor to the extent of their full wages.

IX. The abolition of the contract system on National, State and Municipal works.

X. The enactment of laws providing for arbitration between employers and employed, and to enforce the decision of the arbitrators.

XI. The prohibition by laws of the employment of children under 15 years of age in workshops, mines and factories.

XII. To prohibit the hiring out of convict labor.

XIII. That a graduated income tax be levied.

And we demand at the hands of CONGRESS:

XIV. The establishment of a National monetary system, in which a circulating medium in necessary quantity shall issue direct to the people, without the intervention of banks that all the National issue shall be full legal tender in payment of all debts, public and private; and that the Government shall not guarantee or recognize any private banks, or create any banking corporations.

XV. That interest-bearing bonds, bills of credit or notes shall never be issued by the Government, but that, when need arises, the emergency shall be met by issue of legal tender, noninterest-bearing money.

XVI. That the importation of foreign labor under contract be prohibited.

XVII. That, in connection with the post office, the Government shall organize financial exchanges, safe deposits and facilities for deposit of savings of the people in small sums.

XVIII. That the Government shall obtain possession, by purchase, under the right of eminent domain, of all telegraphs, telephones and railroads, and that hereafter no charter or license be issued to any corporation for construction or operation of any means of transporting intelligence, passengers or freight.

And while making the foregoing demands upon the State and National Government, we will endeavor to associate our own labors:

XIX. To establish cooperative institutions such as will tend to supersede the wage system, by the introduction of a cooperative industrial system.

XX. To secure for both sexes equal pay for equal work.

XXI. To shorten the hours of labor by a general refusal to work for more than eight hours.

XXII. To persuade employers to agree to arbitrate all differences which may arise between them and their employees, in order that the bonds of sympathy between them may be strengthened and that strikes may be rendered unnecessary.

Source: HBS Case No. 372-320.

Exhibit 3 A Selection of the Views of Samuel Gompers

Strikes

For quite a time a great deal has been said in condemnation of strikes by labor or pseudo labor men, with which, I confess, I have no patience. It is true that no man who has given the question of strikes and the labor movement any thought can look upon strikes with favor; but to be continually condemning them is entirely another thing. To know when to strike, and particularly *when not to strike*, is a science not yet fully understood. To strike upon a falling market, or being insufficiently organized, or if organized, not properly equipped with the ammunition so necessary to a successful strike - funds - is unquestionably the height of ignorance. The story of the strikes that may have failed of their immediate objects yet have prevented reductions in wages and worse conditions will probably never be entirely told. Mounting condemnation of strikes, we find, by experience, does not abolish or even reduce their number. As a consistent opponent of strikes, though, I do find that those organizations of labor which have best provided themselves with the means to strike have continually less occasion to indulge in them. The most potent factor to prevent or reduce the number of strikes is a well organized trade union with a full treasury ready to strike should the necessity arise. . . .

It is false economy to suppose that success in a Trade Union results from small initiation fees and low dues. It is idle to imagine and at variance with experience that organizations grow when the initiation fees and dues of Unions are small. It may be true that a Union may be organized and gain a number in its fold upon the cry of low dues, but I am sure the history of the labor movement will demonstrate beyond a doubt that such organizations have been but of a transitory character.

Our Unions should charge a fair initiation fee and high dues. It is likely that they will not receive large accessions of membership spasmodically, but the growth will be steady and continuous. From the large dues paid our Unions should and can be of permanent benefit to their members. Our Trade Unions should contain the benevolent as well as the protective features. They should be the defenders and protectors of the wage workers in every sphere of life. It has been ably said that in all past history it has always been the "remnant" in society that has saved it from retrogression and barbarism. So with the Trade Unions; they are the "remnant" in the present society that must save the people from retrogression and barbarism. Our Trade Unions are the germs of the future society based upon honesty, fair dealing and a broader conception of human rights.

Political Action

Many delegates may feel, and I have heard that the matter would be brought to the attention of this convention, the desirability of forming a third, or what is known as an independent, political party; but in view of recent experience, I can only say that such action, for the present at least, would be in the extreme unwise. If we are zealous and earnest in the advocacy of agitation and desire the enforcement of the eight-hour work day, it will require all we can possibly do to muster all our efforts and concentrate our power upon its attainment. The experiences of the past have taught that we may and can obtain great practical results, both political as well as economical, by creating a healthy public opinion if we devote ourselves energetically to our organization, the development and maintenance of our trade unions.

The Wage System

I know that we are operating under the wage system. As to what system will ever come to take its place I am not prepared to say. I have given this subject much thought; I have read the works of the most advanced economists, competent economists in all schools of thought—the trade unionist, the socialist, the anarchist, the single taxer, the cooperationist, etc. I am not prepared to say, after having read, and with an honest endeavor to arrive at a conclusion—I am not prepared to say that either of their propositions are logical, scientific, or natural. I know that we are living under the wage system, and so long as that lasts, it is our purpose to secure a continually larger share for labor, for the wealth producers. Whether the time shall come, as this constantly increasing share to labor goes on, when profits shall be entirely eliminated, and the full product of labor, the net result of production, go to the laborer, thus abolishing the wage system; or whether, on the other hand, through the theory of the anarchist, there should be an abolition of all title in land other than its occupation and use, the abolition of the monopoly of the private issuance of money, the abolition of the patent system—whether we will return to the first principles; or whether, under the single tax, taxing the land to the full value of it—I am perfectly willing that the future shall determine and work out. I know that as the workers more thoroughly organize, and continually become larger sharers in the product of their toil, they will have the better opportunities for their physical and mental cultivation instilled into them, higher hopes and aspirations, and they will be better prepared to meet the problems that will then confront them. For the present it is our purpose to secure better conditions and instill a larger amount of manhood and independence into the hearts and minds of the workers, and to broaden their mental sphere and the sphere of their affections.

Capital and Labor

I should regard [the possibility that the interests of capital and labor will someday be identical] upon the same plane as I would the panaceas that are offered by our populists, socialists, anarchists, and single tax friends, as very remote and very far removed, if that time should ever come. I am perfectly satisfied to fight the battles of today, of those here, and those that come tomorrow, so their conditions may be improved, and they may be better prepared to fight in the contests or solve the problems that may be presented to them. The hope for a perfect millennium - well, it don't come every night; it don't come with the twinkling of the eye; it is a matter which we have got to work out, and every step that the workers make or take, every vantage point gained, is a solution in itself. I have often inquired of men who have ready-made patent solutions of this social problem, and I want to say to you, sir, that I have them offered to me on an average of two or three a week, and they are all equally unsatisfactory. I maintain that we are solving the problems every day; we are solving the problems as they confront us. One would imagine by what is often considered as the solution of the problem that it is going to fall among us, that a world cataclysm is going to take place; that there is going to be a social revolution; that we will go to bed one night under the present system and the morrow morning wake up with a revolution in full blast, and the next day organize a Heaven on earth. That is not the way that progress is made; that is not the way the social evolution is brought about; that is not the way the human family are going to have interests advanced. We are solving the problem day after day. As we get an hour's more leisure every day it means millions of golden hours, of opportunities, to the human family. As we get 25 cents a day wages increase it means another solution, another problem solved, and brings us nearer the time when a greater degree of justice and fair dealing will obtain among men.

Source: HBS Case No. 372-319.

Exhibit 4 Membership in the American Federation of Labor (thousands)

1881:	40	1901:	787
1882:	65	1902:	1,024
1883:	76	1903:	1,465
1884:	105	1904:	1,676
1885:	125	1905:	1,494
1886:	138	1906:	1,454
1887:	160	1907:	1,538
1888:	175	1908:	1,586
1889:	210	1909:	1,482
1890:	225	1910:	1,562
1891:	238	1911:	1,761
1892:	255	1912:	1,770
1893:	260	1213:	1,999
1894:	275	1914:	2,020
1885:	270	1915:	1,946
1896:	265	1916:	2,072
1897:	264	1917:	2,371
1898:	278	1918:	2,726
1899:	349	1919:	3,260
1900:	548	1920:	4,078

Sources: Leo Wolman, *The Growth of American Trade Unions* (New York, 1924), p. 32; Philip Taft, *The A.F. of L. in the Time of Gompers* (New York, 1957), pp. 233, 362.

Exhibit 5 Labor Force and Employment: 1820 to 1920 (In thousands of persons 10 years old and over)

Year	Total	Agriculture	Manufacturing	Trade
1820	3,135	2,470	(NA)	-
1830	4,200	2,965	(NA)	-
1840	5,660	3,570	500	350
1850	8,250	4,520	1,200	530
1860	11,110	5,880	1,530	890
1870	12,930	6,790	2,470	1,310
1880	17,390	8,920	3,290	1,930
1890	23,320	9,960	4,390	2,960
1900	29,070	11,680	5,895	3,970
1910	37,480	11,770	8,332	5,320
1920	41,610	10,790	11,190	5,845

Source: *Historical Statistics of the United States: Colonial Times to 1970* (Washington, 1975), p. 139.

NA = Not available.

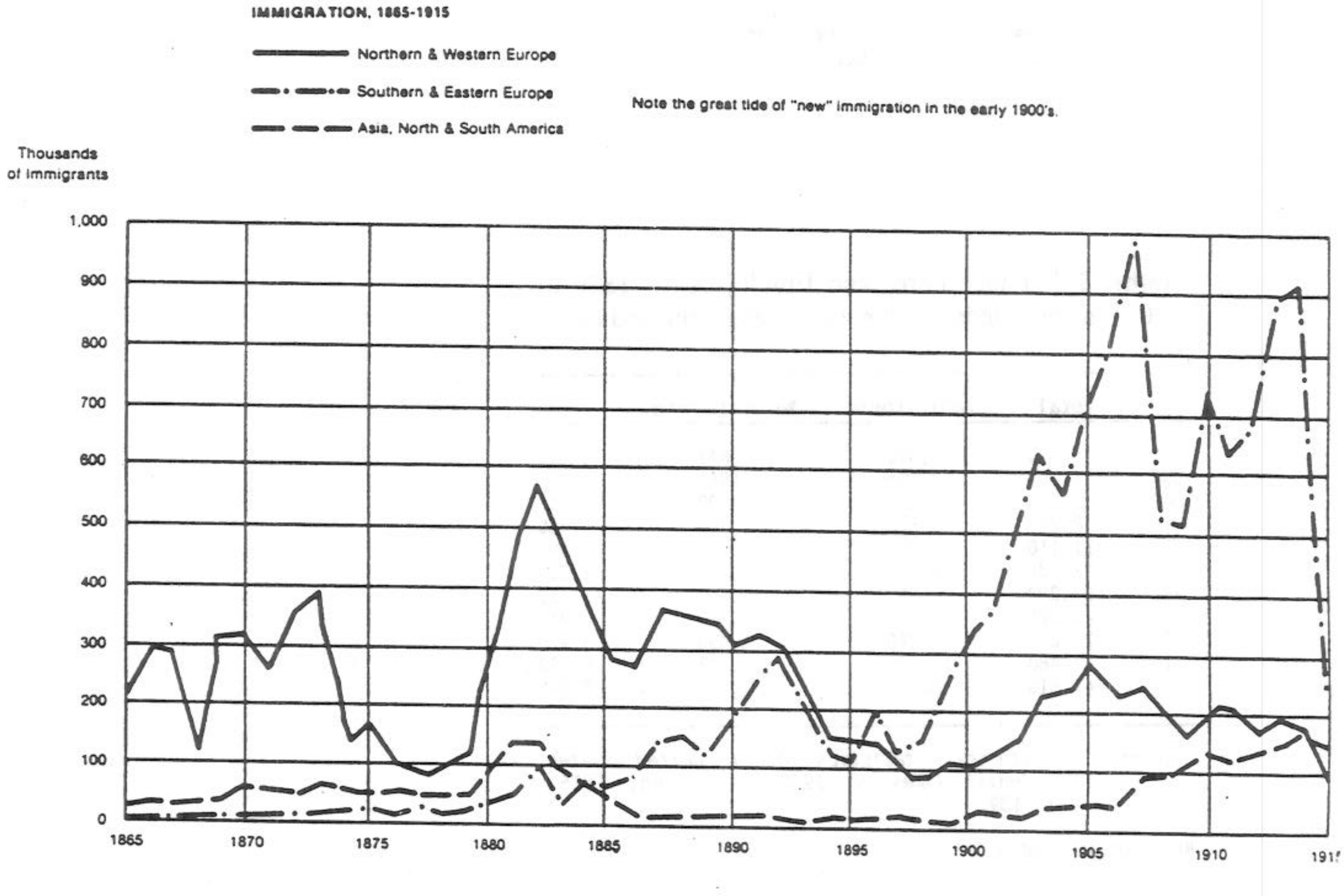
Exhibit 6 Indexes of Employee Output: 1869 to 1920

	Index (1958 = 100)				(1958 dollars)
Year	Output per man-hour[a]	Nonfarm output per man-hour[b]	Manu-facturing output per man-hour	Farm output per man-hour	Output per employee[c]
1890	22.2	23.9	21.2	25.1	$2,438
1900	27.0	29.0	22.9	29.8	2,873
1910	31.3	33.9	26.6	31.0	3,317
1920	38.1	43.0	32.0	31.3	3,774

Source: *Historical Statistics of the United States: Colonial Times to 1970*, p. 162.

[a]For total private domestic economy.
[b]For nonfarm business economy.
[c]Derived by dividing gross national product (in 1958 dollars) by total employment.

Exhibit 7 Immigration Trends



Source: John A. Garraty, *The American Nation* (New York, 1983), p. 476. Reproduced by permission.

Exhibit 8 Chronology of Labor Organizations

1792-1815: Early trade unions formed by shoemakers, printers, and cabinetmakers in various cities. Objectives included higher wages, shorter hours, the closed shop, and union control of apprenticeship.

1806: Cordwainers Conspiracy Case. Strikes found to be conspiracies in restraint of trade, illegal at common law.

1827: Formation of first city central labor federation (in Philadelphia). By 1836, 13 cities had centrals.

1828: Foundation of first Workingmen's Party (in Philadelphia). Others followed, but by the mid-1830s they were absorbed by other political organizations. These organizations favored the ten-hour day, abolition of imprisonment for debt, curbs on licensed monopolies, especially banks, and universal education.

1834: First use of federal troops to intervene in a labor conflict.

Formation of the National Trades Union, an organization of city labor federations. The movement toward national union organizations was checked by the Panic of 1837.

1840: Ten-hour day established for federal employees by executive order of President Martin Van Buren.

1842: Massachusetts Chief Justice Lemuel Shaw finds both unions and strikes for a closed shop to be lawful.

1852: The beginnings of lasting national trade unions:
Typographers (1852), Hat Finishers (1854), Cigarmakers (1856), Iron Molders (1859), and others.

1860: Successful strike of 20,000 New England shoemakers.

1863: Emancipation Proclamation

First of the Railway Brotherhoods (Locomotive Engineers).

1865: Thirteenth Amendment to the U.S. Constitution frees the slaves.

1866: Formation of the National Labor Union, which falls apart in the early 1870s.

1868: First Federal eight-hour law.

1869: Foundation of Knights of Labor, which collapsed in 1893.

1873: Beginning of a severe depression.

1875: Conviction of 24 "Molly Maguires" workmen for coalfield violence; ten hanged.

1876: Foundation of the predecessor of the Socialist Labor Party.

1877: Violent railroad strikes on many railroad lines east of the Mississippi. Nine killed in West Virginia, 26 in Pittsburgh. Federal troops used.

1879: Terence V. Powderly becomes Grand National Workman of Knights of Labor.

1881: Foundation of Organized Trades and Labor Unions, predecessor of American Federation of Labor.

1882: First Labor Day.

1886: Haymarket Affair. Death and injury in a riot following a radical meeting in Chicago called in show of sympathy for failed strike at McCormick Reaper. Labor movement injured by association with the radicals.

1892: Strike by Amalgamated Association of Iron and Steel Workers at Carnegie Steel's huge Homestead Works. About a dozen strikers and Pinkerton detectives killed. Strike crushed by Henry Clay Frick, a top executive of the Carnegie Company.

Martial law declared in the Coeur d'Alene silver mines in Idaho to quell labor violence.

1894: Pullman strike and labor violence in Chicago. Strike crushed and Eugene V. Debs jailed.

1901: Amalgamated Association of Iron, Steel, and Tin Workers defeated in five-month strike against U.S. Steel.

1902: Anthracite coal strike leads to presidential intervention. A qualified victory for the unions.

1905: Formation of Industrial Workers of the World.

1908: Supreme Court holds the boycott to be an illegal restraint of trade. In another case it upholds a state law regulating hours for women.

1911: Triangle Shirtwaist Factory fire kills 146 women and leads to the revision of the New York State factory code.

Publication of Frederick W. Taylor's *Principles of Scientific Management*.

1912: IWW wins wage increases in Lawrence, Mass. textile strike.

1913: Foundation of U.S. Department of Labor.

1914: Federal Trade Commission created to regulate business practices.

Clayton Antitrust Act limits use of injunctions in labor disputes.

"Ludlow Massacre" in which National Guard attacks a tent colony of striking Colorado miners and kills 11 women and two children.

1916: Adamson Act provides eight-hour day on railroads.

Federal Child Labor Law passed (declared unconstitutional two years later).

1919: General strike in Seattle.

Police strike in Boston.

350,000 steelworkers strike for the eight-hour day and the right to organize. Strike fails.

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13

Du Pont: The Centralized Structure

The modern Du Pont company, like the Standard Oil Trust, was a product of a merger of many small single-function family firms. However, the transformation into a modern integrated enterprise came much more swiftly at Du Pont than it did at Standard Oil. The du Ponts moved quickly from a strategy of horizontal combination to one of vertical integration. They rationalized their production facilities even more speedily than did Standard Oil. And they created a carefully defined, centralized, functionally departmentalized organization. This structure, unlike the one developed at Standard Oil, was widely adopted by American industrials. It remains today the standard form of managing a large enterprise mass-producing a single line of products for national and global markets. One reason for these differences in the strategic planning and organizational structure at Du Pont and Standard Oil was that the Du Pont merger occurred in 1902, 20 years after that in the oil industry. The entrepreneurs at Du Pont, therefore, had the benefit of the experience of many older large industrial corporations. They did not have to pioneer in the new ways but could build on what others had learned.

A Change in Command

During the chill winter days of February 1902, the affairs of the venerable E.I. Du Pont de Nemours & Company were drawing to a crisis. Plans for celebrating its 100 years of explosives making were already under way when its president, Eugene du Pont, stricken with pneumonia, suddenly died. The remaining five partners began indecisively to look for a successor. None of their own group appeared to have the necessary qualifications. Four were either too old or in poor health. The fifth, Alfred I. du Pont, at 37 years of age, seemed too inexperienced and erratic. Perhaps the best thing to do, the elder partners decided, was to sell the company to its ancient and friendly competitor, Laflin & Rand. After all, the Du Pont company owned a sizeable amount of its stock, and its president, J. Amory Haskell, trained at the Du Pont-controlled Repauno Chemical Company, had always been close to their interests.

Alfred du Pont disagreed. Young and energetic, he was shocked at the thought of selling the company, his "birthright," to outsiders. If he could get the support of his cousin Coleman du Pont, once his roommate at the Massachusetts Institute of Technology, he would buy it himself. Over long-distance phone, Coleman immediately concurred, but he insisted that they must get Pierre, another cousin, to "handle the finances." A second telephone call brought Pierre's acceptance. The elder du Ponts, on learning of Alfred's allies, were more than willing to sell out to the three cousins at a quickly agreed upon price of $12 million.

This case is a revised and edited version of the first part of Chapter 2 in Professor Alfred D. Chandler, Jr., ***Strategy and Structure*** *(Cambridge: MIT Press, 1962). Reproduced by permission of MIT Press.*

Coleman, a tall, broad-shouldered man with a wide grin, had the temperament and training to create business empires. Pierre, quiet and studious, had the rational, analytical outlook of an organization builder. Ironically, Alfred, trained in the powder mills and most happy when he was personally supervising work on the production line, was far less prepared to rebuild and administer a great industrial enterprise.

Coleman was a member of the Kentucky branch of the family and had never been involved in the explosives industry. After graduating from MIT in 1885, he started work in the Kentucky coal mines owned by his uncle, Alfred Victor du Pont. In a short time, he had taken charge of the coal company, making it one of the largest in the region. Then in 1893, he left the coal company to join two of his uncle's protégés, Arthur J. Moxham and Tom L. Johnson, as general manager of their steel mill in Johnstown, Pennsylvania. These two—the latter was soon to become the famous reform mayor of Cleveland—had built with Du Pont financing street railways in a number of American cities. They had put up the steel mill at Johnstown to provide themselves with rails. Shortly after Coleman arrived, they began the construction of a second plant at Lorain, Ohio, one of the largest and most modern of its day.

As Tom Johnson began to turn his attention to politics, Coleman took over more of the management of the new Lorain Steel Company. He quickly showed his empire-building tendencies by erecting shops to make streetcars together with all their parts, including bodies, wheels, and electric motors. (This last item was one of the most technologically complex products of the day.) In 1898, Elbert H. Gary, backed by J. Pierpont Morgan, persuaded Coleman and his associates to sell the Lorain Steel Company to the Federal Steel Company, which the two financiers had just formed and which three years later was to become the nucleus for the United States Steel Corporation. After the sale, Coleman and Moxham turned their energies back to building electric steel railway systems.

Pierre S. du Pont joined the family company to take a job at its first smokeless powder works, then being constructed at Carney's Point across the Delaware River from Wilmington. When the close of the Spanish-American War brought a reduction of activity at Carney's Point, Pierre saw little future in Wilmington as long as old men were continuing to manage the family firm in the same old way. So he resigned from the company to join Coleman. At Lorain he helped transfer the properties to Federal Steel Company, managed those which had been retained, and assisted Coleman in his street railway ventures.

The Strategy of Consolidation

At the time of Eugene du Pont's death, the company and the industry were being managed just as they had been for more than a generation. The Du Pont company itself administered only a few black powder plants and the new smokeless powder works at Carney's Point. Until 1902, it remained a family enterprise. As one du Pont noted: "The business was entirely managed by the senior partner. . . . The head of the firm was ex officio head of the family." The other partners and nearly all the supervisory force were du Ponts. However, the du Pont family's control ranged well beyond the company. It held stock in other firms, including the Repauno Chemical Company, which was formed in 1880 by Lammot du Pont, Pierre's father, to manufacture a new type of explosive—dynamite. And, through the Gunpowder Trade Association, the Du Pont Company wielded strong influence over the rest of the industry.

The Gunpowder Trade Association had been formed in 1872 when overproduction resulting from the increased output and a surplus of Civil War powder threatened to collapse prices. The association, with each member having a number of votes according to its size, set price and production schedules. After Henry du Pont, the company's president from 1850 to 1889, purchased a controlling interest in more than half a dozen of the larger powder companies during the depression of the 1870s, he held a majority of these votes. To assure compliance with the schedules he set, he worked them out in close cooperation with the executives of other firms and particularly with Solomon Turck, the president of the industry's second largest company, Laflin & Rand. Because of this close cooperation and because of Henry du Pont's policy of buying a stock interest in most of his major competitors, the Association remained more stable and longer-lived than most combinations in American industry.

Henry du Pont and his successor, Eugene, as presidents of the strongest firm in the combination, had a powerful voice in how much other firms produced and at what price, but they knew almost nothing about how each unit carried on its production and sold its quotas. Nor did they particularly care. Neither the individual companies nor the association paid much attention to costs, to improving processes, or to developing more systematic purchasing and marketing techniques. There was little coordination between the marketing and selling companies. With only a few notable exceptions, the manufacturing firms sold through agents who handled the output of many companies and who apparently also became members of the association. Effective administration was impossible because neither the separate firms nor the combination itself had the information or methods to assure an efficient use of existing resources and so to reduce unit costs and increase output per worker. They did not even have a systematic way of gauging existing or potential demand on which to base their price and production schedules. The lack of administrative control is suggested by the fact that during nearly all of his tenure, Henry du Pont carried on singlehandedly from a one-room office overlooking the powder mills on the Brandywine most of the business of his company and of the association. He wrote nearly all the business correspondence himself in longhand.

The du Ponts were also involved in the production of the new explosive, dynamite, invented by Alfred Nobel. Because Henry du Pont refused to take on the new product, his cousin, Lammot du Pont (Pierre du Pont's father) and for many years Henry's right-hand man in the black power business, organized the Repauno Chemical Company. Its works on the Delaware River opposite Chester, Pennsylvania, were completed in 1880. In 1895, the Repauno Company joined with Hercules, Hecla, Sterling, Lake Superior Powder, and Atlantic Dynamite to form the Eastern Dynamite Company. A holding company, Eastern Dynamite had no central office to coordinate flows or allocate resources. It remained merely a more efficient device than a trade association for controlling competition by deciding output, markets, and prices charged by its subsidiaries.

Thus, when the three cousins took over their family inheritance, the inheritance included several small family-controlled firms tied to others in the industry through the Gunpowder Trade Association and the Eastern Dynamite Company. The rather chaotic state of these holdings is indicated by Pierre's comment to his brother Irénée in February 1902 concerning Alfred's proposal to join forces with himself and Coleman.

> I think there is going to be some tall hustling to get everything reorganized. We have not the slightest idea of what we are buying, but we are probably not at

> a disadvantage as I think the old company had a very slim idea of the property they possess.

To Coleman and Pierre, this hustling meant more than reviving the family birthright. Reorganization provided an opportunity to transform this loose federation of many relatively small firms into a consolidated, integrated, centrally managed industrial enterprise. Methodically the two cousins, supported somewhat hesitantly by Alfred, embarked on the strategy of consolidation and centralization. First came a careful inventory of the properties they had acquired. Next, Coleman concentrated his charms on persuading the stockholders in these and many other explosives concerns to turn over their stockholdings to the du Ponts in return for cash or for stock in the new firm—the E. I. Du Pont de Nemours Powder Company—formed to take over the combined properties.

Then Pierre focused his energies on fashioning a structure to administer them. The legal and financial changes were, in his mind, only necessary preliminaries to the operational and administrative ones. As he stressed later:

> At the time we made the purchase of the properties, we realized that if a good investment was to be made for us, it would necessitate a complete reorganization of the method of doing business; that the administrative end would have to be reorganized, numerous selling organizations, or administrative organizations done away with, and we would have to establish a system of costs in order that an economical manufacture could be installed throughout the business. That was prevented, absolutely, by our lack of control of the properties in which we were interested, and we had no means of establishing a new system of organization in any of these companies.

The formation of the powder company made it possible "to operate the properties in one name, through one set of selling agents, and under one management, or operation." Only in this way could the costly duplication of facilities and personnel be eliminated, and different functions—buying, manufacturing, shipping, and selling—be economically and systematically supervised, and the essential coordination between functions maintained.

As the process of consolidation moved along, the strategy pursued became more precise. The earlier combinations—the trade association and the holding company—had attempted to obtain and retain market power through contractual agreements. During their first months in office, the three cousins became aware of, and indeed often appalled at, the difficulties in maintaining such agreements. Several of the firms in the association had two sets of books, one for themselves and the other for the Association's board. The new strategy—one for obtaining and maintaining market power through administrative efficiency—was first clearly defined by Arthur Moxham in a letter to Coleman du Pont written in June 1903:

> I have been urging upon our people the following arguments. If we could by any measure buy out all competition and have an absolute monopoly in the field, it would not pay us. The essence of manufacture is steady and full product. The demand for the country for powder is viable. If we owned all, therefore when slack time came we would have to curtail product to the extent of diminished demands. If, on the other hand, we controlled only 60% of it all and made that 60% cheaper than others, when slack came we would keep *our* capital employed

> to *the full* and our product to this maximum by taking from the other 40% what is needed for this purpose. In other words, you could count upon always running full if you could make cheaply and control 60%, whereas, if you own it all, when slack time came you could only run a curtailed product.

As the reorganizers at Du Pont fully understood, when they were running steady and full, they could produce a keg of black powder at 15% less cost than that of their most efficient smaller competitor and could make dynamite, whose production employed a more continuous process, even more cheaply.

In carrying out the strategy of consolidation and in setting up the centralized structure, Pierre and Coleman drew on their experience at Lorain. The customers and competitors of the Lorain Steel Company were among the technologically most advanced and efficiently managed businesses of the day. The improvements in plant layout and manufacturing organization which Henry Clay Frick and Andrew Carnegie had recently completed at their works were incorporated in the new steel plant at Lorain. General Electric and Westinghouse, Lorain's competitors in the making of electrical engines, must have suggested much about ways to put together a large centralized sales and engineering organization.

The cousins also had a successful model nearer home. In 1892, the du Ponts placed two energetic young executives in charge of the dynamite works at Repauno—J. Amory Haskell, who at 31 had proved himself an able manager of a coal company, and Hamilton M. Barksdale, a trained civil engineer who had worked with the Baltimore & Ohio Railroad. These two decided to build a sales organization of their own. Dynamite was still a relatively new product and dangerous to use. Agents accustomed to handling black powder often failed to explain to contractors, mining companies, and other customers how the new product should be used. So the new managers appointed Charles L. Patterson, one of the industry's master salesmen, to set up sales offices in different parts of the country. He was also to train a force of salaried persons in explosives technique so that they might be able to show customers how to use dynamite efficiently and effectively. As the demand for dynamite grew, Haskell and Barksdale organized production more systematically by forming a manufacturing, an engineering, and a purchasing department.

In 1903, following this model, the three cousins, assisted by Haskell and Barksdale, created much the same type of an administrative organization to knit together the resources of nearly two thirds of the American explosives industry. First they consolidated manufacturing. Production was concentrated in a few of the larger plants, located as advantageously as possible to major markets. They next set up three administrative departments to coordinate, appraise, and plan the work of the plants—one for each of the company's major products: black power, high explosives (dynamite), and smokeless powder. Then they formed a nationwide marketing organization with the old Repauno sales department serving as a nucleus. The engineering, traffic, and purchasing units of the new powder company also drew on the older dynamite company's personnel and procedures. Still another unit proposed by Coleman and Pierre was the development department, which was to concentrate on improving product and processes. As it had no predecessor in the explosives industry, the du Ponts may have been inspired by the recently created research organization at General Electric, the first in the United States. Finally, to house the headquarters of these new departments, Coleman ordered the construction of a large, many-storied office building in the center of Wilmington.

The six persons active in creating the new company now took over its major executive posts. Coleman, as president, became responsible for broad policy and overall company performance. Alfred, as general manager, was given general supervision of manufacturing activities. Pierre became treasurer. Haskell had full charge of selling. Barksdale headed the largest manufacturing department—high explosives—while Moxham, who had come from Lorain with Coleman and Pierre, was given general oversight of the development department. In carrying out their new duties, these six were not only concerned with assuring effective central office planning, appraisal, and coordination of buying, manufacturing, sales, and other functional activities, but they also saw the need to develop departmental designs for coordinating, appraising, and setting policy for each of the several types of field units. Such structure was essential, they believed, if the vast resources under their control were to be employed rationally and profitably.

Creating the Multi-departmental Structure

In the centralized structure, each major department came to have its vice president and its director. The latter was to be responsible for the smooth day-to-day operations of the department; the former was to concentrate more on the long-term planning and appraisal necessary to keep the company alive and growing. Collectively, the vice presidents with the president, acting as the Executive Committee, were to make broad policy for the enterprise as a whole.

Individually, the vice presidents had full responsibility and authority in managing their units. The three manufacturing departments or, as they were then called, the operating departments, had been placed under the general supervision of Alfred du Pont as general manager. But Alfred took the job of vice president in charge of the black powder department and actually continued as de facto plant superintendent of the old Brandywine mills. From their headquarters in the large new office building in Wilmington, Alfred and the vice presidents and directors of the other two operating departments—high explosives and smokeless power—their assistants and staff officers coordinated, appraised, and planned goals and set procedures for the work carried on at the several plants. These departmental headquarters soon had offices for the recruitment and training of personnel, for the inspection of product and process, for the maintenance of plant, for the improvement of processes, and, for a time, for planning new construction and purchasing supplies other than raw materials and equipment. Before long, however, the engineering and purchasing departments became separate units, reporting directly to Alfred as the general executive in charge of manufacturing.

The lines of communication and authority between departmental headquarters and the plants in the field were defined in terms of line and staff. The new departments closely followed the pattern first fully developed in the United States by the Pennsylvania Railroad. The line of authority ran from the vice president to the department director and his assistants, to the plant or works manager, and then to the supervisors and foremen. The plant executives who handled auxiliary functions such as inspection, personnel, or maintenance were responsible to the works or factory managers for their day-to-day working orders. They looked to their seniors at headquarters only for standards and procedures. Executives at headquarters worked at making more precise the information that flowed through these channels in the form of daily, weekly, and monthly reports and concentrated particularly on deriving more accurate cost figures. Such data not only provided a check on plant performance but, by permitting comparisons between plants and between subdivisions with the plants, made it easier to locate weaknesses and inefficiencies.

To improve communication still further between headquarters and field, each operating department held regular meetings of its plant superintendents and headquarters staff where the managers exchanged information on ways to make their activities more efficient and less costly. Papers read at the regular meetings of Barksdale's high explosives department and circulated to all departmental administrative and supervisory personnel covered such topics as standardization of parts and equipment, new manufacturing procedures, safety measures, customers' complaints, comparative costs and savings made at the different plants, morale, incentives, and other items.

Sales activities were as systematically organized as manufacturing. The sales department's director, Charles L. Patterson, soon instituted a structure comparable, although on a much larger scale, to the one he had fashioned at Repauno. Here the field units included 17 sales offices headed by branch managers in different cities in every part of the country. Each manager, assisted by a small staff, supervised the activities of a corps of field staff. Most salespeople specialized on one product—black powder, high explosives, or smokeless powder—although there were a few "general" salespeople. A few also sold small lots of solvents, ether, and other chemicals, by-products of the making of smokeless powder. The salespeople, who were now company employees, completely replaced the old outside agents or jobbers in marketing the company's products to railroads, mines, contractors, and makers of rifle and shotgun ammunition. In addition to the regional branch officers, there were, at headquarters, one office supervising sales abroad and two for handling large customers. Colonel Edmund G. Buckner's Military Sales Division sold smokeless powder to national governments, while the Contractor's Division sold high explosives and some black powder directly to large contractors.

At sales headquarters, Patterson had three line assistants and three staff officers. The three assistant directors were, at first, responsible for the administration of three geographically defined units—the Eastern, Central, and Western Divisions. Later, each came to handle one of the company's three major products. Patterson continued to train his salespeople, as he had done at Repauno, to become experts in the methods of using industrial explosives so that they could work closely with the customer on special blasting problems. Such training became the responsibility of the Technical Division, which also worked at enlarging the market for explosives by studying possible new uses and applications for its products. The other staff units were Advertising and Trade Record Divisions. The latter pioneered in compiling statistics on sales made by the Du Pont company and its competitors. This information became increasingly valuable for making estimates of market demand to be used to set production schedules and then to determine what quantities of raw materials and other supplies must be purchased. These statistics also provided data on the changing share of the market held by the company, which executives at headquarters as well as the branch managers themselves used to check on the performance of each sales office and of the department as a whole. In time, a fourth staff office, the Sales Expense Division, was formed to compile figures on sales costs and to work out methods for reducing these marketing expenses.

Here, as in manufacturing, the relations between headquarters and field were defined on what was essentially a line-and-staff basis. The director, assistant directors, and branch managers had charge of people, while staff executives at headquarters and in the field were responsible rather for standards and procedures. Advertising was more of a line activity, although the advertising office conferred with the field executives about the nature of their programs. To assist the director and vice president of that department in determining policies and the plans for carrying them out, as Sales Board or Sales Executive Committee, consisting of the assistant directors and heads of staff offices, met regularly to determine price schedules, to approve of

advertising programs, and to decide comparably tactical decisions. Also the sales department appears to have had meetings of headquarters and field officers similar to those in the manufacturing departments.

The five other functional departments reporting directly to the president—essential materials, development, real estate, legal, and treasurer's—were somewhat smaller than sales or operations. The first became responsible for the procurement and transportation of raw materials necessary for production. In 1906, after the new structure was in full operation, Pierre made long-term contracts with nitrate-producing firms in Chile to be assured of supplies of raw materials. In 1911, the company purchased these properties, but they continued to be administered locally, not from Wilmington. The coordination of the flow of supplies from Chile and elsewhere to the Du Pont plants became the job of the essential materials department.

The initial responsibility of the development department was to supervise the two laboratories set up to improve the company's products and the ways of making them. The Eastern Laboratory, founded at Repauno in 1902, concentrated on developments in dynamite, while the Experimental Station, built the following year on the Brandywine, specialized in black powder and the newer smokeless powder. The latter, it might be pointed out, was not an explosive, as was dynamite or black powder, but rather a propellant used for rifle and shotgun shells or, on a much larger scale, for military projectiles. The development department also worked on broad problems concerning markets or sources of supply, usually at the request of the top executives in the central office. It was, for example, on the basis of this department's investigations that Pierre purchased the Chilean nitrate properties.

The treasurer's department provided the central office with even more valuable and more regular information. Beside their routine financial activities—the handling and supervision of the myriad financial transactions involved in any great industrial enterprise—the financial executives concentrated on developing uniform statistics essential to determining overall cost, income, profits, and losses. The department, at first divided into three major units—the treasurer's office and the Accounting and Auditing Divisions—came to have, by the time of World War I, additional units that administered credit and collections, salaries, and forecasts and analyses. The auditing unit gathered information on general external financial and economic conditions as well as on the company's internal performance, while the accounting office continued to develop cost data for production, sales, construction, research, and other activities.

The central office, like that of other sizable industrial enterprises, comprised the functional vice presidents and the president, who had one or two assistants. Since the administration of the enterprise as a whole was considered to be the collective task of the senior executives, overall coordination, appraisal, and planning came to be formally carried out in three committees—Finance, Executive, and Administrative. The make-up and duties of Finance and Executive Committees were similar to those in many of the new consolidated industrial firms. The Finance Committee, at first, included the largest stockholders—the three cousins and the older members of the family who had received stock payments for their holdings. The Executive Committee consisted of the people most responsible for fashioning the new organization and then, as time passed, the president and vice presidents in charge of the functional departments.

From the very first, Pierre and Coleman insisted that the Executive Committee should concentrate on long-term planning and appraisal; it must not become involved in making decisions concerning the operating activities of the different departments. Since planning the future use

of current facilities and personnel and the development of new resources involved the allocation of funds for both capital and operating expenses, the Executive Committee increasingly took over the financial duties originally assigned to the Finance Committee. Moreover, as the older members of the Finance Committee had little understanding of the new company's operations and policies, the committees' active members soon were only Pierre and Coleman du Pont. For all practical purposes the Finance Committee became temporarily defunct.

The coordination of day-to-day activities of the different departments was left to the Administration or "Operative" Committee made up of departmental directors. Its weekly meetings not only helped to coordinate plans and procedures, but they also provided a place for the interchange of a great deal of information. The members made proposals to the Executive Committee and discussed ways to carry out the strategies and policies that the senior group had agreed upon.

Structural Modifications 1903-1919

After its initial shakedown, the structure fashioned in 1903 remained relatively unchanged until after the end of World War I (see **Exhibit 1**). The modifications which did occur affected the central office rather than the departmental headquarters. These changes were of three sorts. The most important resulted from shifts in the company's top command, which in turn reflected the final transformation of the Du Pont company from a family firm to a professionally managed enterprise. A second type of change was the growth of auxiliary departments at the central office, and a third, the improvements made in the informational data used to administer the enterprise as whole.

Of the three cousins who engineered the massive reorganization of the company and the industry, Pierre soon proved himself the most adept in governing it. Alfred preferred to stay close to the black powder operations, where he had long worked. Coleman, the empire builder, quickly lost interest in managing the domains he had helped create. Before long, he had a controlling interest in the Equitable Life Assurance Society, and, partly as a result of the changes he encouraged there, he built which was then the largest office building in New York. He turned also to politics, becoming a member of the Republican National Committee in 1908. But Pierre devoted all his energies to the administration of the new Du Pont Company. As its first treasurer, he developed essential statistical data. In 1906, he became the de facto head of the company and in 1909, at Coleman's request, he took the title of acting president.

In January 1911 Pierre, with Coleman's support, relieved Alfred of his duties as general manager and as vice president in charge of the black powder department and a member of the Executive Committee. They retained him as a vice president and had him rejoin them on the Finance committee. Increasing deafness had hindered Alfred's effectiveness. His divorce and remarriage created intense personal and family tensions. But his failure as an administrator was the basic reason for his removal. He was highly competent in personally supervising work in the mills, but he had shown little talent for broader coordination, appraising, and goal setting.

Alfred's removal brought younger people into top management. Barksdale became general manager, and Pierre's brother Irénée his assistant. The new department heads and members of the Executive Committee—Harry Haskell, the brother of J. Amory Haskell in high explosives; R. R. M. Carpenter, a brother-in-law of Pierre in development; Harry Fletcher Brown

in smokeless powder; Frank L. Connable in black powder; and John J. Raskob, Pierre's secretary since the Lorain days, as treasurer—were experienced and loyal administrators.

In the year following these personnel changes came another reorganization. The U.S. District Court, finding that the company had violated the Sherman Antitrust Act, approved a plan to divide its industrial explosives and sporting powder business among three companies—the existing Du Pont company and two new firms, the Hercules Powder Company and the Atlas Powder Company. While this reorganization deprived the Du Pont company from some of its plant and personnel, it had little effect on its basic structure or strategy. These many changes did prove, however, to be too much of a strain on the acting president. After Pierre's health broke, Barksdale became acting president as well as general manager.

Then in 1913, Coleman returned temporarily to oversee the Du Pont company's activities. Pierre, back again in the saddle early in 1914, soon came into conflict with Coleman. At the end of February, shortly after he had received the title of vice president, Pierre removed Barksdale and put Irénée du Pont in the general manager's post and, at the same time, asked for the resignation of Moxham. The latter, though still active in the Du Pont company management, had been making plans with two of Pierre's brothers-in-law to consolidate several of Du Pont's competitors into a single large firm.

Coleman was apparently disturbed by these changes and other policies that Pierre had instituted, although the evidence available on this controversy is anything but clear. When, in the summer of 1914, Coleman was forced to undergo a serious intestinal operation at the Mayo Clinic in Minnesota, he wrote to Pierre suggesting that the issues be resolved either by letting him buy Pierre out or by having Pierre purchase his share. Pierre would not hear of the first alternative and hoped to avoid the second. "Before giving further thought to parting, let us take another try at it on the old basis as you suggest," that is, by having Pierre again assume full command. "I will accept the acting presidency, or perhaps it will be better to assume your duties under the title of vice president which I now have." Pierre then suggested changes in the company's top personnel which he hoped Coleman would find satisfactory.

Within a few weeks, Coleman and the board of directors had accepted Pierre's proposals with some modifications. Pierre was again to be acting president and responsible for overall company policy and performance. Irénée, Pierre's brother, became general manager. He was to oversee sales as well as operations and also became chairman of the Executive Committee. Pierre and Irénée would then both be "general" officers responsible for the company as whole. The rest of the older executives in the command were retired. J. A. Haskell, Barksdale, Moxham, and Patterson (who became a member of the Executive Committee in 1907), relieved of active work, would continue with the company "on salary in advisory capacities" with the title of vice president. The new vice presidents, like those appointed in 1911, were young and loyal to Pierre but also was all experienced and professionally competent.

In carrying out these changes, Pierre deliberately rejected the long-entrenched inherited attitude that the firm was managed for the family and the family was to manage the firm. Alfred and even Coleman or Barksdale (who had married a du Pont) should continue in top positions, Pierre clearly believed, only if they continued to be effective administrators. Pierre did appoint family members (two brothers and a brother-in-law) to senior posts in 1911 and 1914, but only after they proven themselves managerially competent. From this time on, the criterion for

promotion was competence rather than family background—universalistic rather than particularistic.

With the changes in top command completed, Pierre carefully defined the duties of the central office. In so doing, he reemphasized his strong commitment to the delegation of authority and responsibility and made clear his belief in individual rather than group responsibility for operating administration. The Executive Committee must not interfere with the day-to-day activities of the departments. He insisted that:

> Subject to the Board of Directors and Finance Committee, the Executive Committee have full power in the control of the company's affairs. It is desired that this power be used only with discretion in order to:
>
> (A) Throw responsibility on the heads of departments, where one department alone is interested; and
>
> (B) Throw responsibility on the heads of two or three departments in matters arising which affect but two or three departments.
>
> In the latter case, should the several heads of departments fail to be unanimous, the decision is to be made by the chairman of the Executive Committee.
>
> Thus it is expected that the Executive Committee should issue final orders only in cases where more than three departments are interested in the decision and on such other matters as the president asks them to decide for him.

The committee's job was to consider only problems and policies of the company as a whole, to set broad goals and policies for the departments, and to coordinate interdepartmental activities in the general interest. Pierre did not expect it to ignore departmental work: "Discussion and criticism of affairs affecting less than four departments is entirely proper," he continued, "so long as discussion and criticism is constructive and given in a spirit to aid the departments interested, but it is not desired that there should be fault-finding where a better solution of a question is not offered."

The Finance Committee, Pierre proposed, was to be returned to "its original position." It would no longer report to the Executive Committee as it had in recent years, but was to be considered equal, and even senior to the latter committee. Still its powers were essentially negative. It would approve the annual and semi-annual estimates of appropriations drawn by the Executive Committee, "thereby authorizing a general financial plan under which the departments may act without further reference to the Finance Committee." Only requests of over $300,000 would be considered in detail. The committee's approval would also be necessary for appropriations of more than $150,000 not included in the annual budget. Finally, it would approve plans for providing funds for future expenditures, and it would recommend dividends. After an exchange of letters, Pierre and Coleman decided the committee should include themselves, Alfred, and William du Pont, the son of Henry du Pont, the company's domineering president of an earlier generation.

In this way, Pierre permitted the major stockholders to retain a say in company affairs without interfering with major policy decisions. They might, if Alfred and William joined with Coleman, reject important proposals made by the Executive Committee for the allocation of funds and other resources, but even here all the data on which they based decisions were those provided by the more professional managers on that committee. Still, they had general oversight of their investment and could make it clear when they disapproved of important policy. The limits to even these powers are suggested by the fact that only a year later Alfred and William were bringing suit against Pierre and other executives over the sale of Coleman's stock.

Just as Pierre was instituting these changes, came the war in Europe and the enormous expansion of the company's munitions business. Total employment at Du Pont grew from 5,300 in 1914 to 85,000 by 1918. Gross capital investment, $83.5 million in 1915, reached $309 million by 1918. Profits soared. Yet, within the company, the existing organizational structure proved admirably suited to meet the needs of this phenomenal growth. Few organizational adjustments had to be made. Black powder operations, which had become of relatively minor importance, were placed in the high explosives department. Plans for postwar product diversification resulted in the creation of a miscellaneous manufacturing department under Lammot du Pont, Pierre's brother.

Of more significance was the growth of the auxiliary or service departments. The Chemical Division came even before the war. It was formed in 1912 to take charge of the research laboratories when the development department turned its energies to devising a strategy of diversification. After 1914, the engineering, purchasing, and traffic departments all grew enormously under the wartime demands. Administratively, these departments became attached to the central office, with their directors reporting to the president. So too did the Military Sales Division. The relations between the enlarged auxiliary central office departments and the major operating, sales, treasurer's, and essential material departments were not clearly defined until 1919.

The years just before and during the war saw continued advance in the development of statistical data and of the procedures for its use. Pierre and the financial officers systematically refined the methods used for allocating funds. Procedures for the appropriation of capital expenditures included the use of general forecasts of economic conditions and detailed proposals for individual projects. Well before 1918, the forecast and analysis section of the treasurer's department was assisting the functional departments and the Executive Committee to allocate rationally funds and other resources by providing "forecasts for probable financial conditions extended twelve months in advance. . . revised every month." Each specific request for capital appropriations had to include the particulars of cost of, need for, and estimated rate of return on investment for the proposed project.

Among the notable advances made during these years in the working out of information so essential for central office planning, coordination, and appraisal were the techniques that F. Donaldson Brown devised for calculating the rate of return on investment. Brown, trained as an electrical engineer at Virginia Polytechnic Institute and Cornell, had joined the Du Pont sales department in 1908 after serving as general manager of the Baltimore sales office of the Sprague Electric Company. In 1912, he was placed on Barksdale's staff in the general manager's office and, in 1914, became one of Raskob's assistants in the treasurer's department. For Brown, rate of return on equity or even return on capital invested was an inadequate tool for administrative control and strategic planning. As he emphasized, the rate of return on capital invested increased

as volume rose and decreased as it fell. The higher the throughput, the greater the rate of return. Brown termed this rate of flow "turnover." He defined it as the dollar volume of sales divided by total investment. Brown then related turnover to earnings as a percentage of sales (then the definition of profit in much of American industry). He did this by multiplying turnover by profit so defined, which gave a figure that accurately reflected the intensity with which the enterprise's resources were being used. This formula devised by Brown (see **Exhibit 2**) is still the method employed by the Du Pont Company and many other American business enterprises to define a rate of return. The significance of this formula was that it provided executives at both central and departmental headquarters with an accurate standard with which to appraise each operating unit's performance, to locate the sources of deficiencies and inadequacies, and to change and adjust present plans and policies.

Further Centralization, 1919

With the war's end, Pierre became convinced that a new set of executives should take command. Although he was still under 50, he thought that he and others in top management needed and deserved a rest. More important, new challenges called for young blood and fresh ideas. As Pierre told the board of directors in April 1919: "I am firmly of the opinion that we now have reached another turning point in the conduct of affairs at E. I. Du Pont de Nemours & Company; therefore, it would seem wise to place responsibility for future development and management of the business on the next line of men." Pierre had already consulted Irénée, Raskob, Harry Haskell, and one or two others as possible replacements for the older executives. He now proposed that a subcommittee of the Executive Committee, consisting of Donaldson Brown, who a year earlier had taken Raskob's place as treasurer, Frederick W. Pickard, who, at the same time, had become vice president in charge of sales; Lammot du Pont, chief of the miscellaneous manufacturing department; and Harry Haskell as chairman, study and recommend ways to improve the company's organization.

Haskell was more concerned about structure than personnel, and the changes he favored were essentially those that would strengthen the centralized organization that had worked so admirably during the wartime expansion. As vice president in charge of the high explosives department, he replied to Pierre's proposal for a thorough turnover of top management by saying:

> I quite agree with the principle of advancing the younger men to positions of executive responsibility, for I believe that one reason the Company has been so successful is that for over 20 years the conduct of its (business) is in the hands of young men and this has served to keep off the dry rot of conservatism that sometimes accompanys [sic] too unchanging management. On the other hand we have sometimes lost by not getting full value out of experienced men—witness Barksdale and J. A. [Haskell]. Perhaps the new plan will be flexible enough not to repeat the mistakes in the latter respect.

Haskell, recalling earlier changes, added: "I have believed in reorganization by evolution rather than the Company's more usual custom by revolution, but I guess it's a good thing to take a little corporate calomel once in a while and if we get rid of the wheat with the tares, why we never quite know whether we are individually wheat or tare and so can comfort ourselves in the belief that maybe it is the other fellow."

Then Haskell turned the matter of structure, urging Pierre to simplify and to centralize still further the present organization:

> Regarding manufacturing, I feel very strongly that our present method of splitting operations into their parts without any effective means of coordination of effort is inefficient and indefensible. Instead of creating three brand new operating vice presidencies, I would strongly advise one overall manufacturing operation, with a very high class assistant, the latter on the Executive Committee and as many managers or directors as may be found convenient for the specialized operations of different parts of the manufacture. It may be that it would be better for a few years to carry on the dye business as a separate entity. I think it would because it is a developing, understandardized industry and should merit independent attention just as the Pyralin chemical mixtures business was better by itself until standardized—when it was merged with the regular sales and operating departments.

At the end of March, 1919, Haskell's subcommittee on organization made its report, which spelled out more explicitly the suggestions and implications of what its chairman had written earlier to Pierre. Its authors thought in terms of organization needs and, in describing them, used organizational concepts that had only recently been developed.

Many words and ideas of the committee's report indicate its awareness of current ideas concerning large-scale organization. Its members, as concerned with practice as with theory, examined the experience of other companies. Beside talking individually to outside executives, they sent an assistant to study four companies with similar problems—Armour, Wilson and Company (both meat packers), International Harvester, and Westinghouse Electric.

The committee's report began with a careful definition of terms, followed by a lengthy statement of administrative theory. Here the basic points dealt with the purpose of organization:

> The ideal condition is one in which every unit in a group is so coordinated and controlled that each functions to the best advantage with respect to its own work and the work of the whole company.
>
> The object of organization may be defined as the attainment of maximum results with a minimum of effort. If we have not enough men of the right sort, maximum results would be impossible. If we have too many men, the results would be obtained at unnecessary expense.

Next came an enunciation of two "principles" based on the company's experience. The first rested on the belief that:

> The most efficient results are obtained at least expense when we coordinate related effort and segregate unrelated effort. For example, purchase of materials is unrelated to sale of a finished product in a much greater degree than manufacture and sales, or manufacturing and purchasing; and legal work is still more unrelated to either of those before mentioned.

This does not mean, the report continued, as "it is so often said, that good organization results from putting like things together." It then gave an example:

> For instance, it is natural to think that all engineers and engineering work should be grouped in one engineering department. Now, surveying a farm, designing and building a bridge, running a locomotive, or operating a powerhouse, are all "engineering," but it is quite obvious that they are so unrelated that to group them under one head would be uneconomical. On the other hand, the operation of a boiler house at Carney's Point is similar in name and reality to the operation of a boiler house at Haskell, yet one would not think of grouping them under one head in exchange for the authority to exercise over each of them by the plant superintendent.

The basic principle was rather "that it is related effort which should be coordinated and not 'like things.' In fact it is often more necessary to combine related efforts which are unlike." For example, the report noted, as had Haskell in his letter, that the present dye-stuff business, like the chemical-mixture business a few years before, was not yet standardized. Therefore it would be wise to have it maintained:

> One individual in control of both production and sales, because the relation of the product and its qualities is so mixed up with the demands of the market for the product that to divorce them and segregate the business into a clearly defined production department and an independent sales department, would be detrimental to the business. Later on when the production of dyes becomes standardized it will no doubt follow the evolution of other portions of the business.

The principle of coordinating "related effort" normally called for placing the different broad functional activities into separate administrative units.

A second underlying principle was that of giving each executive in charge of a set of coordinated or related efforts full authority and responsibility. This was, the committee stressed, the only way to assure flexibility and adjustment in the face of constant change. Here the report repeated and made more explicit the concept of delegation of individual responsibility and authority which Pierre had so often stressed:

> The principle of individual responsibility and undivided authority has been recognized by the Company and consistently followed in the cases of its established divisions. A unit once defined—for example, the Sales Department or the Development Department—is placed in charge of the best available individual, who as head of that department is held responsible for results, and he can in his official capacity arrange every detail of his department according to his best judgment, subject only to the alternative of having someone replace him if his official judgment is not good. The same principle is followed in turn in the case of branch office managers or plant superintendents, who are individually responsible for the conduct of that part of the Company's business over which they have charge, subject only to the business being conducted according to the principles and methods laid down by the authority next higher up. It is to the

> recognition of this principle that we may in large measure attribute the Company's phenomenally successful performance during the recent abnormal years.

This principle had not been fully effective, the report continued, for the Executive Committee had tended to make decisions concerning departmental activities despite Pierre's earlier strictures. The result had been a dangerous trend toward committee management and away from individual responsibility. It must be recognized, the report went on, that:

> We have defeated the principle to a partial extent by allowing the Executive Committee to act for the president as the immediate superior in an executive way to whom the department heads are held responsible. The interposition of a committêe charged with the duty of performing executive acts better done by an individual is, we believe, responsible for most of the minor inefficiencies, inconveniences, wasted effort, and unnecessary duplication which are matters of common knowledge to those engaged in carrying out the daily routine. These are usually small matters with relation to the business as a whole, and for this reason rarely impose themselves on the attention of the higher officers. Nevertheless, in the aggregate they are of no mean importance.

On the basis of these two principles, the committee made its recommendations. First, it suggested that most of the company's activities be segregated into four functional "grand divisions"—the production, sales, development, and treasurer's departments, each headed by a vice president. The production department, for example, would include not only manufacturing activities but also purchasing, engineering, construction, research, chemical process control, and a number of other service functions. The remaining few "joint functions, such as traffic, medical, etc., shall be assigned by or on authority of the first vice president." In other words, the day-to-day administration of all Du Pont activities was to be concentrated in the headquarters of four functional departments. "The objection has been advanced," the report admitted, "that some of the grand divisions are too large and too diversified to be under the control of one individual. The answer is that the controlling individual need not know every detail of the business, but requires only a good mind, sound judgment, and knowledge of general business principles." The committee thus solved the problem of the relations between the auxiliary departments in the central office with the major functional departments by merely incorporating the former into the latter. They would now be staff units at departmental headquarters rather than in the central office.

The central office itself was otherwise little changed. The first vice president (a new position), and not the Executive Committee, was made specifically responsible for appraising and coordinating the work of the major departments and for holding their chiefs accountable for their performance. On this point, Haskell and his colleagues cited the experience of the four—Armour, Wilson, International Harvester, and Westinghouse—"where executive control was definitely centralized under a general officer," and "in no cases were divisions or departments responsible to a committee."

The Executive Committee was to be concerned with policy planning and overall appraisal. "The proper function of the Executive Committee," the report read, "is to exercise general supervision over the company's affairs; to decide all questions of policy, and in general to act in the board's stead, and to see that all conduct of business is in accordance with the wishes and policies laid down by the board." The subcommittee on organization thought "it would be better

to start with a small Executive Committee, adding one or two members to it later should it appear that some portions of the four grand divisions were not being adequately represented." The committee continued to rely on the departments for information on which it based its decisions. Except for the data provided by the financial offices, the central office had no sources of information outside the department or ways to check their data. Nor did the central office yet have the responsibility for coordinating the forecasts made by the manufacturing, sales, and purchasing departments even though such coordination was necessary if the movement of product from one department to another was to be smooth and steady.

While the four persons signing the report agreed that there should be a Finance Committee, they differed as to its role and make-up. Some, recalling its operation before 1914, thought it again "should be a branch of the Executive Committee." Others held "that matters financial should be segregated from the Company's other activities," and that, as finally recommended, there continue to be two separate committees. "The opinion was unanimous," the report continued, "on the desirability of having as many members in common as possible on both committees."

The report was then sent to Pierre for study. The president liked its general outlines, but, as he told a special meeting of the board, "the selection of men must to a certain extent precede the choice of form of organization." The structure should be built around people rather than fitting people into an ideal structure, as Barksdale had earlier suggested. Pierre recommended the promotion of younger executives and proposed that the present Executive Committee members be moved to the Finance Committee, where they would serve in a broad advisory capacity. Actually they were to have more of a semi-retired position similar to that of J. A. Haskell, Barksdale, and Patterson after the 1914 changes.

Pierre than listed his choices. He would retire as president, becoming chairman of the board with nominal duties. Irénée would be president, and Lammot, chairman of the Executive Committee. This committee would include, besides Donaldson Brown and Frederick Pickard, six relatively young but experienced managers, only one of whom was a du Pont or related to the du Pont family. The Executive Committee and then the board immediately approved Pierre's recommendations.

Within a short time, the new Executive Committee had accepted with some modifications the recommendations of the Haskell report. The major difference was that the purchasing (including traffic), chemical, and engineering departments continued as separate units, although the single production department did have its own large service department made up of the Technical, the Welfare, and the Materials and Products Divisions. This decision left unanswered the nature of the relationship between these more service-like departments and the major operating ones. So the chemical and engineering as well as the new personnel and the older legal and real estate departments now became explicitly advisory staff organizations. They worked to develop standards and procedures for the company as a whole and to advise both the departmental and central officers. But their executives were not to give orders to personnel in the line departments. Purchasing, which now handled the procurement of raw materials and the obtaining of supplies for all the company's facilities, continued to make the major buying decisions and so remained, like production, sales, and finance, a line rather than staff office.

Once the revised structure had been agreed upon, the new Executive Committee members took up their posts as department heads. William C. Spruance became vice president in charge

of production; Walter S. Carpenter, Jr., (R. R. M. Carpenter's younger brother) took over the development department; J. B. D. Edge was put in charge of purchasing; and Brown and Pickard remained the heads of the treasurer's and sales departments. The staff departments—chemical and engineering—were not represented on the committee. Three remaining Executive Committee members had charge of the major subdivisions of the production department—explosives, cellulose products, and paint and chemicals.

By the summer of 1919, the Du Pont Company was ready to meet the postwar world with a new but experienced and seasoned set of top managers and a simplified management structure. The departmental directors administered the operational activities in each major function at their headquarters, while the vice presidents in charge of the functional departments and two general officers, meeting collectively as the Executive Committee, made the strategic and entrepreneurial decisions. Few more rationally planned and thoroughly tested designs existed for coordinating, appraising, and planning the activities of a great vertically-integrated industrial enterprise. And yet, even the best-laid plans for corporate strategy and structure could go awry. It remained to be seen whether the Du Pont Company could continue into the 1920s the extraordinary record of success it had enjoyed since the three cousins first began to reorganize the firm in 1903.

Exhibit 1 Du Pont Structure, Circa 1911

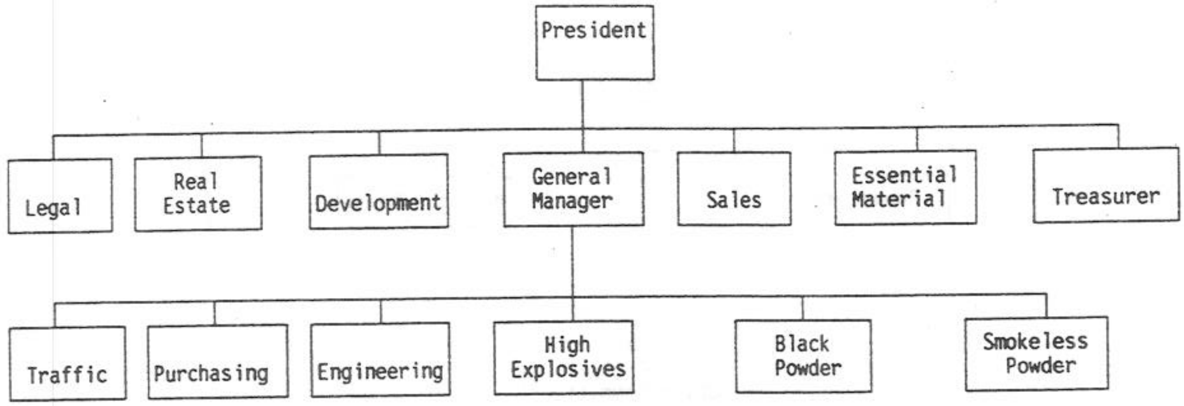


Exhibit 2 Relationship of Factors Affecting Return on Investment

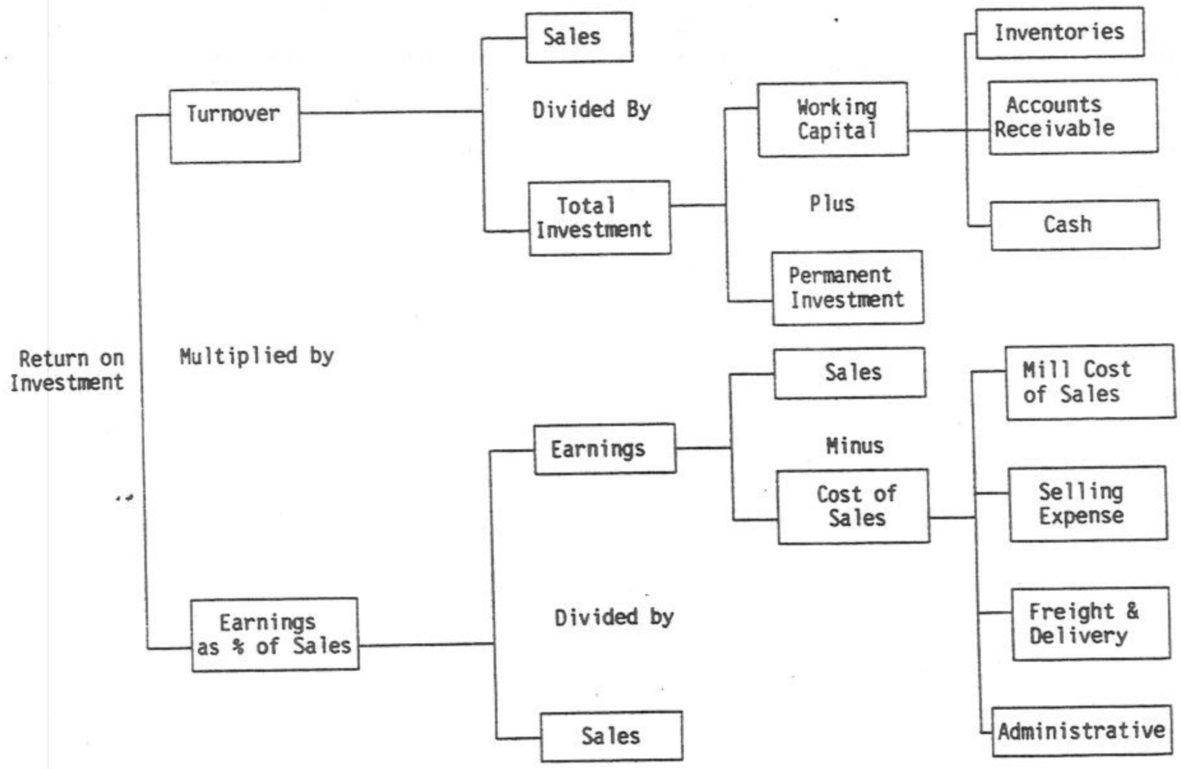


Exhibit 3A Du Pont Structure, 1919-1921

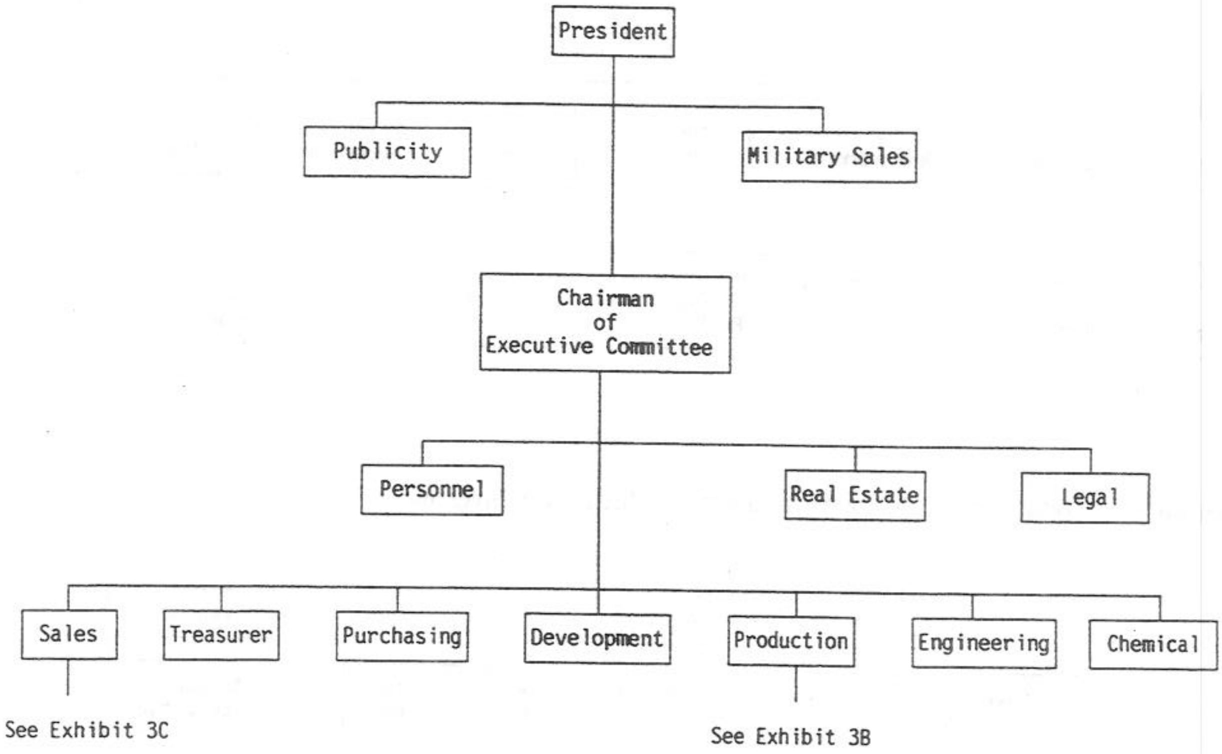


Exhibit 3B Du Pont Production Department, 1919-1921

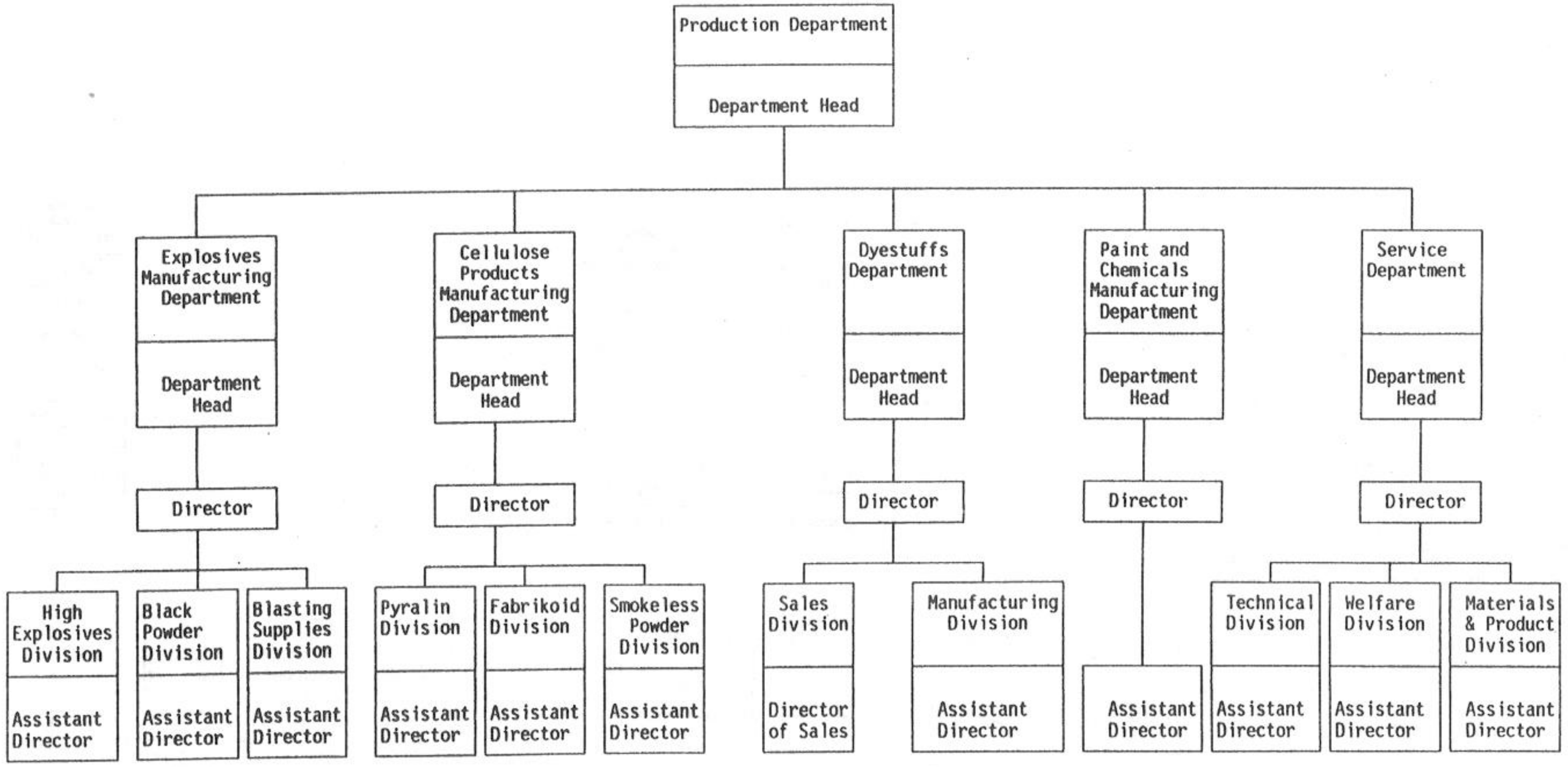
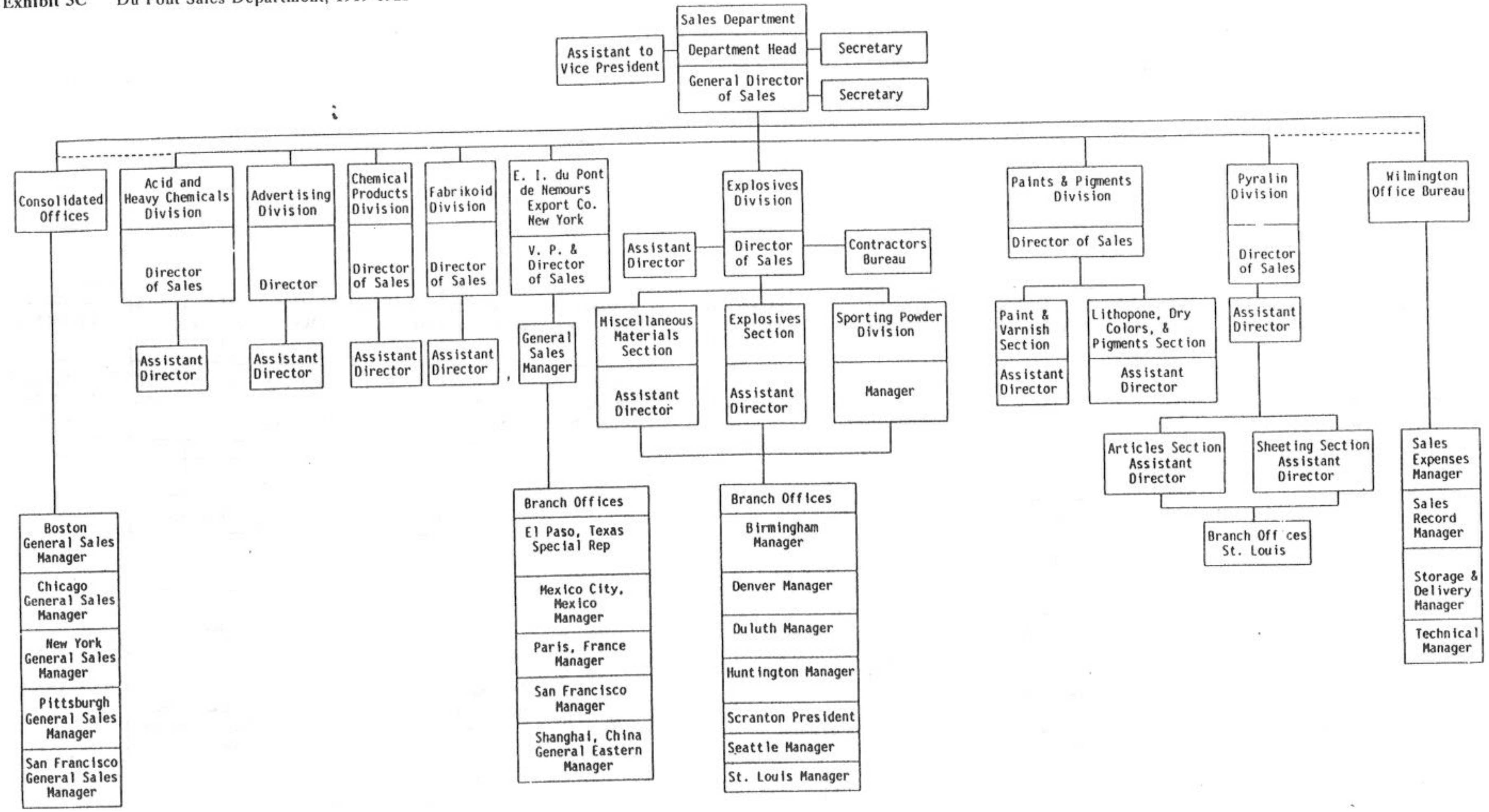


Exhibit 3C Du Pont Sales Department, 1919-1921



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14

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THE CONGLOMERATES AND THE MERGER MOVEMENT OF THE 1960s

The mid-1960s have been referred to as the "go-go" years in the history of American finance.[1] The great bull market, powered by such glamor stocks as IBM, Xerox, Polaroid, Kodak, and Control Data, resulted in record prices. In January of 1966, the Dow Jones Industrial Average breached the psychologically important 1,000 mark for the first time.

An important component of these "go-go" years was intensive merger and acquisition activity. This activity was different from the two previous merger waves (at the turn of the century and in the 1920s). In the 1960s, a new kind of business enterprise played a key role in mergers and acquisitions. This was the conglomerate. Eleven of the top 25 acquiring companies in the 1960s were classified as conglomerates.[2] These eleven firms acquired over 500 companies between 1961 and 1968. And these acquired companies represented over 92% of the acquired firms' assets by the latter year.

The defining characteristic of the conglomerate--that trait which differentiated it from the diversified company--was said to be that it made its acquisitions in unrelated industries. The wide variety of conglomerate investments is illustrated by Table 2 of the Diversification Tables in this case. It should be noted, however, that it is not at all clear where the definitional line should be drawn between a conglomerate and a diversified firm. Table 1 shows that some diversified firms do business in a wide variety of industries. This is especially striking when Table 1 is compared to Table 3, which shows the lack of diversity of the product lines of the largest Japanese manufacturers.

Nevertheless, it can be said that the classic conglomerates--firms like ITT, Litton, Textron, and Ling-Temco-Vought--approached diversity in a way different from that of the typical diversified. They expanded by acquiring unrelated firms in a variety of industries with nothing in common, and they developed a new administrative structure to manage their holdings.

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[1]See John Brooks, The Go-Go Years (New York: Ballantine, 1973).
[2]Eight were petroleum companies and six were classified as "other." Federal Trade Commission, Economic Report on Corporate Mergers, 1969.

The readings and tables which constitute this case were collected and assembled by Professor Alfred D. Chandler, Jr. as the basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation.

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Because the individual companies which comprised the conglomerate produced such diverse products, many functions could not be supervised at the level of the central office. While the related-diversified firm had advisory staffs for such critical functions as R&D and marketing for its various divisions, the conglomerate did not. Typically, therefore, central offices of conglomerates were small. Often those with sales of over $1 billion had fewer than 100 people above the operating level. The primary functions of the central office included finance, acquisitions, control, and some minor staff functions. Legal and planning responsibilities were sometimes also included. Clearly, the first two activities--finance and acquisitions--predominated and, in fact, characterized the conglomerate. This left purchasing, production, R&D, and marketing to the separate divisions (i.e. the former firms). In fact, the supervisory role of the central office consisted to a large extent in setting quotas for the various units--of management by objectives--and judging performance on a quantitative basis.

Critics of the conglomerate have attacked both its strategy and structure. Of the former, they have claimed that through complex financial manipulations, hostile takeovers, frequent reorganizations, and the like, the conglomerates attempt to create value where none should exist. At best, they say, this amounts to concentrating on paper profits instead of investing in plant and equipment. Others have claimed that by commanding massive resources in scores of different industries, the strongest conglomerates present a threat to the marketplace that is beyond the reach of antitrust law. Still others have pointed to the highly opportunistic and performance-oriented nature of conglomerate management. This approach is said to saddle their subsidiaries with short-time horizons which are antithetical to stability and long-term economic growth.

The central criticism of the conglomerate structure is that it fosters under-administration and the wasteful duplication of functions. Curiously, the unique "top light" structure of the conglomerate managerial hierarchy has been used to explain both higher and lower levels of efficiency as compared with the "concentric" (related-diversified) multi-divisional firm. Some believe that centralizing finance and acquisition functions at the top level creates legitimate synergies. However, others believe that efficiencies in the more critical areas of production and R&D are lost, resulting in overall poor performance. Some experts believe that the most important defect of the conglomerate is that the monitoring of current performance and the allocation of resources for future efforts are perforce the responsibility of executives whose knowledge of the businesses they are overseeing has to be very limited. The result is that they are forced to manage by the numbers. Quantitative indicators are of course essential to all managers, but the problem in the conglomerate is the extent to which the managers will be able to understand what the numbers really mean.

Despite these problems, the conglomerate corporations were widely heralded in the 1960s as an important new innovation. Their executives received plentiful favorable publicity and most impressive was their performance on Wall Street.

But it was on Wall Street that the doubts which existed about conglomerates made themselves felt toward the end of the decade. Litton stock fell 50% in two months in 1968, proving to be a harbinger of more general conglomerate troubles soon to come. The reasons for the dramatic decline of conglomerate market values by the end of the decade were complex. Fears of government action against them, stricter accounting procedures, a torpid stock market, reports of poor conglomerate performance, and questions about their abilities to continue high rates of growth all played a part. As conglomerates fell from the position they would never regain and the financial limelight turned elsewhere, government oversight not only quieted but soon took on an almost conciliatory tone. In 1972, an FTC report on conglomerate mergers was released, stating that "From a competitive standpoint, the effects of conglomerate diversification . . . appear to be neutral."[3]

* * * * *

This case is composed of two articles and a set of Tables. The first article by Neil H. Jacoby on "The Conglomerate Corporation" published in The Center Magazine of July 1969 focuses on the environment that brought into being the merger movement of the late 1960s--a movement highlighted by the creation of many of the best known of today's conglomerates. Jacoby proposes a Conjuncture Hypothesis to explain this merger movement as well as the two earlier ones that have occurred in the United States. The peaking of mergers came, he suggests, when two conditions occurred. The first was when business people perceived new profit opportunities that could be exploited through mergers. The second condition was the existence of an exuberant capital market enjoying a strong demand for new securities. Jacoby then outlines the changes in the larger environment that created

[3]Stanley E. Boyle and Phillip W. Jaynes, Economic Report to the Federal Trade Commission--Conglomerate Merger Performance: An Empirical Analysis of Nine Corporations, National Technical Informational Services, U.S. Department of Commerce, November, 1972, p. 127.

opportunities that might be realized through mergers at the time when the capital market became buoyant in the mid-1960s. He concludes by evaluating the possibilities for both private and social gains accruing from the new conglomerates that were created in the resulting merger movement and by analyzing the impact these mergers had on concentration and competition.

The second reading is Norman Berg's study of the "Corporate Role in Diversified Companies," a working paper prepared at the Harvard Business School. Berg compares and contrasts the organizational structure of the new conglomerate with that of the older diversified enterprise or, as Berg calls them, "the diversified majors." Of particular importance are Berg's findings on the differences between the corporate staffs of the two types of enterprises. He suggests that these differences in structure reflect the views of their general executives as to the role and function of the general office and the goals of the enterprise as a whole.

Lastly, the case presents a set of tables which illustrate the extent of diversification of the largest corporations in the United States and Japan.

* * * * *

THE CONGLOMERATE CORPORATION

This decade has witnessed the third great wave of corporate mergers in the American economy during the present century. Its dominant feature has been the burgeoning of the conglomerate corporation. During 1968 more than forty-four hundred companies disappeared by mergers (including combinations and acquisitions) involving an estimated forty-three billion dollars' worth of securities - an all-time record.[1] In this tidal wave of mergers, which may now have crested and begun to recede, conglomerate firms accounted for a substantial or a preponderant fraction of all firms and assets involved, depending upon the definition of "conglomerate."

Why did a third merger wave peak in the nineteen-sixties and emphasize conglomeration? Is the conglomerate a stable and efficient form of business, the heir apparent to American corporate power? Or is it a financial fad, a source of monopoly, a threat to small business? Does it pose any new problems of public regulation? Is it monster or model of the future?

I

The Conglomerate Defined

"Conglomerate" is used herein to mean a business corporation producing products or services of several industries that are unrelated with respect to raw material sources, product development, production technology, or marketing channels. A "conglomerate merger" brings together two or more such enterprises engaged in unrelated lines of business. It is a particular mode of enterprise growth in which the firm penetrates industries outside its current operations.

Many managers of diversified firms avoid use of the word, believing that it denotes lack of any inner logic and has a pejorative ring. They prefer to describe their companies as "multi-market" or "multi-industry" firms. However, "conglomerate" has gained too wide a currency to be discarded, and it is a special kind of multi-industry firm.

Modes of enterprise expansion may be classified as follows:

(1) Vertical

- (a) Backward (toward raw material sources)
- (b) Forward (toward consumers of final products)

(2) Horizontal (market extension within the same industry)

(3) Product extension (into additional industries)

- (a) Producing related products (concentric)
- (b) Producing unrelated products (conglomerate)

Merger is a minor method of growth of American business corporations, the predominant source being internally generated funds. Up to recent years most mergers have been of the vertical or horizontal types, in which the surviving firms acquired other firms within the same industries or industrial groups. During the nineteen-sixties, however, most large mergers involved firms operating in different industries. Some encompassed firms producing products that were <u>related</u> with respect to sources of raw materials, production technology, or marketing channels. These have been aptly termed "concentric" companies. Others involved <u>unrelated</u> enterprises - the true conglomerates.

Product relationships are, of course, a matter of degree, and opinions may differ on whether those within a diversified company are significant. Spokesmen for multi-industry firms often offer tenuous theories of centrality to avoid the brand of conglomerate. Are such traditional giants as General Motors (diesel locomotives, refrigerators, and air conditioners as well as motor vehicles) and General Electric (jet engines and metallurgical

chemicals as well as hundreds of electrical products) conglomerates or concentrics? Should Transamerica be classed as a concentric because its avowed field is "services?" Norton Simon, Inc. because it "serves the needs of the individual as a consumer, homemaker, and person?" Bendix because it is committed to "growth through technology?" Or Occidental Petroleum Corporation, which describes itself as a "producer and processor of natural resources?" Occidental, for example, rejects the conglomerate label because common technologies are used in exploring for and producing oil, natural gas, coal, sulphur, and phosphates, and all of these raw materials enter into fuels, fertilizers, industrial chemicals, and plastics, its major products.

On the other hand, there are many huge corporations whose activities are so disparate that their managements do not even attempt to formulate a theory of centrality. Among them are Litton Industries, whic makes office equipment, builds ships, operates restaurants, sells packaged foods, and operates national development plans, among many other activities. Ling-Temco-Vought, International Telephone and Telegraph Company, Gulf & Western Industries, and Tenneco, Inc., are other conglomerates whose manifold products clearly lack common raw materials, production technology, or marketing channels. Even the names of some conglomerates imply an all-encompassing generality, such as National Environment, Commonwealth United, or National General.

Although concentric companies are sometimes grouped with conglomerates, it is preferable to adopt a strict definition, which focuses attention upon the managerial and financial economies that distinguish the true conglomerate corporation. The conglomerate has managerial and financial control over products so diverse that negligible economies of scale can be realized in performing the functions of product development, purchasing, production, or marketing. Thus it differs from multi-plant, or multi-product, or multi-industry firms that do achieve these economies. It differs, on the other hand, from the investment company, which does acquire ownership interests in firms producing unrelated products but does not have management and financial responsibility for them.

II

Lessons from the Past

We may more confidently assess the meaning of the current wave of conglomerations, predict its duration, and forecast the economic effects and public regulations it may produce by examining the course of past merger activity in the United States. Economic historians generally agree that the American economy has experienced three major business merger episodes since the eighteen-nineties.

The first wave, in which activity rose markedly above its long-term trend during the five-year period of 1897 to 1902, peaked in 1899. In the peak year approximately twelve hundred mining and manufacturing corporations with total capitalizations of $2.3 billion (about ten billion in 1968 dollars) were involved The major thrust of this wave was the joining of local and regional railroads into national systems and of one-plant manufacturing companies into national multi-plant entities. U.S. Steel Corporation, U.S. Rubber Company, and American Can Company were born in this epoch.

The second episode, marked by a high level of activity during 1924-30, reached its peak in 1929. In that year some 1,250 mergers were reported, apparently involving securities of much larger total value than in 1899. Vertical and horizontal combinations of manufacturing, public utilities, and merchandising companies were prominent in this wave.

The third period of hyperactivity began about 1965, when the graph of annual mergers broke sharply upward from its long-term trend line. Mergers continued to rise through 1968 when some 2,500 mining and manufacturing companies were acquired with around twenty billion dollars' worth of securities. The most prominent actors in this wave were the conglomerates.

The long-term curve of merger activity displays much kurtosis. A four- or five-year buildup to a peak year of activity has been followed by a year or two of swift decline. In view of the anti-inflationary policies of the Nixon Administration and consequent leveling of stock prices, this pattern suggests that 1968 may turn out to mark the high point of the current wave, and that merger activity will subside during the next year or two to a "normal" level. If so, 39 years would separate the second and third peaks, while 30 years separated the first and second peaks. Over the past 75 years, merger activity has risen at a rate of under four per cent per year. Because this has been little more than the rate of growth of real G.N.P., merger activity does not appear to have become relatively more important over the long term.

Although measures of merger activity are incomplete and one may not generalize upon a basis of two or three waves, the evidence supports a conjecture that the hectic merger activity of 1968 will not be matched again for a number of years. The economy is probably not moving up an accelerating secular trend of business concentration through merger, and conglomeration should not be viewed in apocalyptic terms. The forty-four hundred business corporations that disappeared by merger during 1968 were a small number compared with the twelve thousand that disappeared by failure, or the two hundred and seven thousand new corporations formed. Even the 43 billion dollars in securities exchange mergers that year was less than four per cent of the market value of corporate securities.

III

Merger Episodes: An Hypothesis

Why has American merger activity taken the historical form of a strong wave at long time intervals? We know that merger peaks have not corresponded closely with peaks in production, commodity prices, or overall business activity. Of all economic indicators, merger activity has been most closely related to movements in industrial stock prices. A booming stock market has been present at the crest of all merger waves. Yet a high level of mergers has not accompanied all stock market peaks.

In the extensive literature on mergers, three theories have been advanced to explain their motivation and economic effects. Many observers have seen in business combinations only the elimination of competitors, so that surviving firms can reap monopoly profits. Others have stressed the dominance of promoters and bankers, who engineered mergers in order to sell securities to the public at inflated prices. Still others have viewed mergers as a natural response of businessmen to new opportunities to reduce costs and expand sales and profits in a competitive environment. We may call these the "monopoly," the "stock promotion," and the "efficiency" theories.

None, taken by itself, provides a satisfactory explanation of the long periods of time that have separated peaks of merger activity. There is no reason why the quest of businessmen for monopoly power should mount to a climax every thirty or forty years. Stock market cycles have been much shorter than a decade in their duration. Population growth and technological changes, which father business opportunities, take place more or less continuously.

The conjecture is made that <u>long-term merger waves in the United States are explained by the infrequent conjuncture of two preconditions</u>: (1) an accumulation of perceived and unexploited profit-making preconditions for enlarging the scale of enterprises, arising from basic technological and social changes, and (2) a buoyant capital market with strong demand for new securities.

This Conjuncture Hypothesis, which is put forth as an interesting conjecture and not as a scientific theory, combines elements of the "efficiency" and "stock promotion" theories. It asserts that, before merger hyperactivity can occur, there must be present both an unusually large number of opportunities for enlarging profits by combining independent firms, and strong public demand for the new securities created in the merger process. Because these two preconditions do not often coincide in time, merger hyperactivity is much less frequent than stock market peaks.

The Conjuncture Hypothesis reasons that the predominant motives for mergers are the drive of businessmen to realize larger profits by capitalizing upon newly perceived economies of scale, and the ability of bankers to sell new securities to the public on profitable terms. It rejects the notion that

monopoly power has been an important motive for corporate mergers during the past half century. The quest for monopoly power apparently did play a role in the first merger wave that peaked in 1899, because antimonopoly laws were then not vigorously enforced. Since World War I, however, the Sherman Act, the Federal Trade Commission Act, and state antimonopoly laws have generally forbidden combinations that threatened to create undue market power. The Conjuncture Hypothesis does not, of course, imply that substantial advantages of larger scale are necessarily present in all mergers. History demonstrates that in the hyperenthusiasm of a stock market boom many mergers are launched that later founder on the rocks of reality.

Why does a combination of a large number of perceived opportunities for profits from enlarging firms and buoyant capital markets occur infrequently? The idea that change is the only constant in modern society is by now a cliché. Less well understood is the distinction between tactical (small, superficial) and strategic (salient, structural) changes. Most tactical changes cancel or offset each other through time. A few cumulate into strategic shifts in the structure of technology and society. Not only do strategic changes take many years to accomplish but there is a time lag between their occurrence and their general perception by people. Many strategic changes create opportunities for profit by enlarging enterprises. In the pervasive optimism of a stock market boom, once-overlooked opportunities, or known opportunities previously not financeable, are acted upon. Given the rapidity of communication in financial markets, such perceptions multiply and build up to a climax. Wall Street goes through a phase of "merger madness."

Later, the pool of profit-making opportunities for business combinations is drained. Concurrently, financial expectations deteriorate. Merger activity falls off as quickly as it previously mounted. Many years pass before structural changes in technology and society create a new pool of perceived chances for gains from enlarging the scale of corporate operations. When a new reservoir of opportunities has been filled, and this knowledge permeates the business and financial communities, the conjuncture of a boom in equity security prices will trigger another merger wave.

Let us consider merger waves of the past. Certain structural changes set the stage for the first peak in 1899. One was the creation of a national railway network during the eighteen-eighties by the connection of hundreds of local and regional lines and the building of tens of thousands of miles of new lines. The same era witnessed the completion of national telegraphic and telephone communications. These facilities enormously reduced the cost and increased the speed of transportation and communication. National markets became a reality. By 1895 opportunities for profit by combining firms into larger units and reaping the benefits of lower costs through economies of scale in production had grown immensely. Meanwhile, the nation had developed a national capital market. By 1895 rising security prices had met the other necessary condition, and the first merger wave rolled on. That stock promotion gains may have played a significant role in this merger wave is suggested by the fact that a large number of the combinations made in that era subsequently failed.

The structural changes that undergirded the second merger peak in the nineteen-twenties also took place in transportation and communication. With the development of reliable mass-produced motor vehicles and the completion of a national network of all-weather roads, the U.S. economy was motorized after World War II. Autos and trucks gave people and goods unparalleled mobility, enlarging markets, destroying local monopolies, and creating new economies of scale. Concurrently the home radio receiver made national advertising cheap and effective, built the value of national brand names, and enhanced the advantages of national marketing. Single-unit distribution was doomed. By the mid-twenties, businessmen generally perceived the astonishing opportunities for larger firms opened up by these changes. The booming stock market of 1921-29 satisfied the other precondition, and the second great merger episode was under way. Its economic rationale focused upon economies of scale in marketing, although it also exploited production economies.

IV

Structural Foundations of the Conglomerate Merger Wave of the Nineteen-Sixties

The Conjuncture Hypothesis is consistent with the main facts about the great merger wave still under way. Structural changes in the United States since World War II had by the early nineteen-sixties created a pool of perceived opportunities for profits by enlarging the scale and diversifying corporate operations. The buoyant capital market that emerged in the last half of the decade triggered the merger boom that began about 1965 by making it easy to sell new securities to the public. Most fundamental and powerful of the underlying structural changes was a revolution in management science. Other contributory factors were the poatwar research-and-development explosion, the rise of the service economy, a quantum increase in taxation, and a doubling of the price of capital.

1. Management Science and Computers

Radical changes occurred in the science of enterprise management after World War II. These changes had their roots in the wartime efforts of mathematicians to solve complex logistical and military problems by "operations research." Concepts and methods were then developed that were later found to be equally powerful in dealing with the management problems of a civilian economy. Intuitive judgment has been progressively superseded by rational decision-making processes. Such problems as evaluation of investment projects, choice of financing plans, locating facilities, scheduling production and controlling inventories are now solved by mathematical and statistical methods.

The concurrrent phenomenal development of electronic computers has promoted and facilitated the expansion of management science. The computer not only does routine accounting with fantastic speed but performs that great volume of calculations involved in solving management problems. In 1950 only a few computers were operating in businesses; at the end of 1968 there were more than twenty thousand.

This fundamental development has created opportunities for profits through mergers that remove assets from the inefficient control of old-fashioned managers and placed them under men schooled in the new management science. Managers are able to control effectively a larger set of activities. Being of general applicability to business operations, management science makes possible reductions in financial and managerial costs and risks through acquisitions of firms in diverse industries. These gains differ markedly from the familiar economies of scale in production, purchasing, or marketing that normally accrue from mergers of firms with related products. Thus the new management science is the primary force behind conglomeration.

2. Research and Development Explosion

In the postwar era outlays on scientific research and development have grown nearly fourteen per cent a year, from $1.5 billion in 1946 to nearly $24 billion in 1968. This dramatic increase in the national commitment to applied science and technology is a seminal factor in the evolution of the U.S. economy. By the nineteensixties it had created whole new industries - lasers, cryogenics, oceanography, electroöptics, xerography, and so on. It had generated thousands of new products in established industries - plastics, synthetic fibers, aircraft, electronic equipment, among others. Most important, it had evolved a proven method for deliberately creating commercially needed products through research.

Research and development is now an established function of corporate business. Its economics call for organizations of considerable scale and specialization, which, in turn, require large sales volumes to keep down costs per unit. Also, research produces unexpected findings, and leads enterprises into diverse industries and product lines. These are powerful motives behind mergers of the conglomerate type.

3. Rise of the Service Economy

During the past quarter of a century, the United States has been transformed from a "commodity" to a "service" economy. Most working Americans now produce services rather than tangible commodities. White-collar jobs outnumber blue-collar jobs. As real incomes have risen, and leisure time has expanded, a larger part of income is spent on personal and professional services, transportation, education, and recreation; a smaller part on food, clothing, and shelter. Established service industries like insurance, banking, consumer finance, medical care, air transport, television, motion pictures, and education have enormously enlarged their dimensions. Whole new service industries have come into being, such as computer leasing, auto rental, credit card and travel agencies. Data generation and processing aspects of service industries - which by definition serve masses of people - are especially large. Service industries have generally been in the forefront in computerizing their operations and using advanced management controls. It is no accident, therefore, that some of the largest conglomerates have specialized in services, including Transamerica, International Telephone and Telegraph, and National General.

4. Quantum Leap in Taxation

A fourth factor underlying the current merger wave is the steep rise in the load of corporate-income taxation since World War II. In 1940 the effective federal corporate income-tax rate was twenty-seven per cent; in 1968 it was fifty-three per cent, including the ten per cent surtax. Rates of state and local taxes on business incomes have risen commensurately.

The manifold impacts of heavy income taxation on corporate policies can scarcely be exaggerated. They are a prime move behind mergers. International oil and minerals companies with unused foreign tax credits acquire companies whose incomes can be "sheltered" by those credits. American petroleum producers with large drilling expenses acquire high-profit firms for the same reason. Companies with profits merge with those having losses carried over from previous years that can be used to offset the profits. Many railroads found that diversification enabled them to use their past losses to reduce the tax liabilities of the companies they acquired. A central motive behind Container Corporation's union with Montgomery Ward to form Marcor was to defer payment for several years of more than sixty million dollars a year of federal income taxes by taking fuller advantage of Ward's ability to defer taxes on profits arising from installment credit sales.

Equity securities of companies acquired in a merger are often replaced by convertible debentures of the surviving company, resulting in the replacement of taxable income paid out as dividends by tax-deductible interest. Also, debenture holders have been able to defer income taxes on their profits until the debentures are paid off. Tax avoidance is a powerful private motive for merger that puts a premium on conglomeration vis-à-vis vertical or horizontal combinations.

5. Doubled Price of Capital

Since World War II the price of capital - the going rate of return to investors - has more than doubled. Medium-grade industrial bonds that yielded 3.3 per cent in 1945 returned 7.2 per cent in late 1968. Home mortgage loan rates went from four per cent to eight per cent in the same span of time. The dominant cause of the doubled price of capital can be expressed as a vast expansion of demand for investment funds in relation to the available supply. Expanding American research and development activities, the reconstruction and modernization of European economies, and the demands of less-developed countries have combined to open up unprecedented demands for investment funds. Demand has tended to outrun available supply. Europe felt the sharpest impact of this imbalance and long offered higher returns to investment than did the United States. During the mid-sixties the difference began to shrink by a marked rise in U.S. interest rates. Today, prices of capital are about equal in the world's major money markets.

The higher price of capital has had many consequences. Corporations have tried to use their capital more efficiently. Cash management programs have proliferated. Investment projects have been screened more rigorously.

The finance officer has moved to the top of the corporate hierarchy. Aggressive managements have looked for merger partners laden with cash or liquifiable assets. Banks, insurance, and finance companies have been especially sought after as acquisitions by industrial companies, because of their steady inflows of deposits, premiums, or loan repayments. Yet any company with liquifiable and low-earning assets has been a target. Thus, the pervasive quest for financial resources has been the motive behind many a conglomerate merger.

V

Private and Social Gains from Conglomeration

An exploration of the principal structural changes in the U.S. economy that have fostered conglomerate mergers helps to identify the gains that may accrue from this kind of corporate diversification. A critical distinction should be drawn between social gains and private gains. Public policies should encourage, or at least permit, those mergers that have the potentiality of yielding net gains to society. It should not encourage those that result only in transfers of wealth or income among individuals.

The two principal kinds of private gain from mergers are promotional profits and reductions in tax liability. While these private gains may or may not be accompanied by social benefits, it is probable that both result from most conglomerate mergers.

Consider the extreme case of a merger whose sole purpose and effect is to generate profits for promoters and bankers, who take advantage of the optimism of the public during a stock market boom. The standard gambit is to have a "growth" company, whose stock is selling at a high multiple of its annual earnings, acquire another company whose stock is evaluated at a low multiple of earnings, in the expectation that after a pooling of interests the market will value the equity of the expanded survivor at the higher multiple. In the atmosphere of a boom this expectation is often realized. Earnings per share of the acquiring firm will increase as a result of the merger. The market will apply the high multiplier and bid up the price of the stock. This makes further acquisitions through exchange of stock attractive. They are the basis of a further expansion in reported earnings per share and further inflation of the market price of the stock.

The game can continue until the public recognizes that there is no growth in the operating earnings of the acquired companies. The price of the conglomerate's stock then plummets to a point where the price/earnings ratio is normal. At this much lower price, further acquisitions are unattractive and cease. Meanwhile, promoters will probably have unloaded their shares on less sophisticated investors, and bankers will have pocketed their commissions. By assumption the mergers produce no social benefits, so that all that happens is a transfer of capital values from one to another set of individuals. Such "stock promotion" mergers have tended to take the form of conglomeration in recent years, because court decisions have made other large mergers difficult.

Public policy can do little to prevent such mergers, beyond enforcing Securities and Exchange Commission regulations requiring full disclosure of all material facts. If speculators ignore the rule caveat emptor, they suffer the consequences. A good number of the mergers during past waves have subsequently failed, implying a want of real social gains. Of course, their promoters may have sincerely believed that real gains were possible, but their hopes were disappointed. Given the dynamism and complexity of business life, predictions of social gains are inevitably hazardous, and there is no feasible means of distinguishing promoters with honest intentions from others. The public is best protected by education and full disclosure.

The second type of private gain from mergers is reduction of tax liability. If a company with carried-over losses is merged into a profitable company, reducing the taxes of the survivor, government may be obliged to impose heavier taxes upon other firms in order to restore the preëxisting level of revenues. There is a shift of tax burden from stockholders of the merged companies to those of the other firms. Society will be unaffected, except for a possible deterioration in the equity of the tax system.

Public policy can do little to inhibit mergers arranged solely to cut taxes, given the high tax rates. Opportunities for reducing taxes by merger could be curtailed by radical simplification of the structure of federal taxation of corporate income. This structure is now highly differentiated and shot through with special treatment of particular industries.

Several types of gains from mergers are, at least potentially, of value to society.

(a) Reduction of the risk/reward ratio. By definition, the conglomerate firm combines operations unrelated in respect to raw materials, technologies, or markets. The annual sales or profits of its different operations will be negatively correlated. In the aggregate they will produce a more stable return through time. For any given rate of return on investment, risk will be less; for any given risk, expected reward will be higher. The standard gain from portfolio diversification will be realized. This benefits society as well as the conglomerate's stockholders, because the reduction in the premium for risk is equivalent to a cut in the company's costs and, via market competition, in the prices of its products.

(b) Lower capital costs and avoidance of "Gambler's Ruin." Closely related to the gains of diversification are the advantages reaped by the conglomerate of lower capital costs and avoidance of "Gambler's Ruin." The conglomerate can raise funds on either a debt or equity basis at lower cost than could its constituents.

In addition, having a "long purse," it is in a position to finance temporary operating losses of a subsidiary that would bankrupt the latter if it were an independent firm. The conglomerate is in a position to "out-spend, out-dare, and out-wait" smaller and financially less secure firms in

its effort to win a market. This is socially beneficial, provided that the conglomerate continues to face adequate competition in its several markets - a subject to which we shall return. Of course, this same argument can apply to any large corporation - whether conglomerate or not.

(c) Economies of scale in performing general management functions. Acquisitions can enable the conglomerate firm to apply over a wider sales base the talents of a skilled general management team. General management functions are involved, and include those of planning, organizing, staffing, budgeting, and controlling - generic functions in all kinds of enterprises. While organizational structures of conglomerates differ, the central corporate management commonly delegates wide authority to each divisional management, and holds the latter accountable for a "target" rate of return on the investment in its division. The central corporate officers enforce a planning and controlling discipline upon all divisional managers. They make the major decisions on capital allocation. Characteristically, they also provide a kind of "inside" management consulting service to the entire organization.

(d) Acquisition of highly specialized management talent. Closely related to the third factor is the possibility that the conglomerate, with its larger and more diverse activities, can utilize efficiently specialized experts in operations analysis, computer science, behavioral science, incentive systems, international business, and so on. The scale of operations of the smaller firms it acquires is often too small to justify their cost.

(e) Transfer of assets to more efficient management. A real social gain occurs when the assets of an enterprise are transferred via merger into the control of a superior management. Striking advances in management science, combined with great inequalities among firms in its application, have opened up extensive opportunities for gains from such transfers. Through more informed decisions and better information systems, resources can be deployed with greater efficiency, resulting in lower costs and product prices. While this kind of social gain can flow from any kind of merger, it is most likely in conglomeration. The reason is that market competition generally compresses differences in the quality of management of firms in the same industry to a smaller dimension than is present among firms in different industries. Hence the frequency and size of such gains from conglomerate mergers is probably greater.

In what proportion of conglomerate mergers are social gains realized, and how large are those gains? Regrettably, these questions cannot be answered in the present state of knowledge. Answers would require intensive, elongated case studies of the costs, prices, profits, and managements of conglomerates and their constituents, before and after merger. Most conglomerate corporations have had too recent a life history to permit confident conclusions. Professor J. F. Weston analyzed the financial performance of fifty-eight multi-industry firms over the 9-year period 1958-66. As might be expected, their sales grew at an annual compound rate of 17.8 per cent a year, double that of all U.S. manufacturing firms. Earnings

per share grew 10 per cent a year versus 6.7 per cent for all firms in the Standard and Poor's stock index. Stock prices at each year' shigh point rose 10.5 per cent a year, against 5.4 per cent for the Dow-Jones industrial average. In 1967 conglomerates earned 12.6 per cent on their net worth compared with 11.9 per cent for all manufacturing firms.

Prima facie, the conglomerates gave a superior performance. Yet, these figures do not prove that they managed assets more effectively than other corporations. Many of the firms in the Weston study were concentrics rather than true conglomerates. His study did not take into account the heavier leveraging of equity capital by conglomerate managements - a stratagem that is profitable during strong business expansion, but which can backfire under adversity. Also, conglomerate managers not infrequently introduced new accounting practices that inflated their earnings. Empirical proof of the frequency and size of gains from conglomeration thus remains to be produced.

VI

Conglomeration, Concentration, and Competition

The most important issue of public policy raised by conglomeration is its effect upon the vigor of competition. Traditionally, business mergers have been identified with tendencies to monopoly. This is understandable, because most mergers in past years have been of the horizontal or vertical types. Many have increased industrial concentration - the percentage of the total sales or output of an industry accounted for by its leading four or eight firms. Economists generally agree that there is a positive but loose corrrelation between the level of concentration of an industry and the probability of noncompetitive or oligopolistic behavior by its leading firms. When the preponderance of all output of an industry is produced by three or four leading corporations, collusion among them is easier, or there may be a tacit mutual recognition that all can profit from higher than competitive prices. As the level of industrial concentration drops, the chances of noncompetitive behavior diminish and become negligible when the number of competing firms is more than twenty. Proposed mergers of important members of the same industry are therefore properly scrutinized by the anti-trust authorities for anti-competitive consequences, and are generally frowned upon. This is not to deny that there is vigorous competition in many highly concentrated industries (i.e. automobiles), and that mergers of several weak firms in such industries may sometimes create a strong enterprise able to offer sharper competition to its rivals than did its components.

A conglomerate merger involves a union of firms in different industries. It necessarily leaves the ratios of concentration of all industries unchanged. Conglomeration does replace two or more smaller firms with one larger enterprise, and thus may increase macro-economic concentration - the percentage of total industrial activity in the economy accounted for by the leading hundred or two hundred nonfinancial corporations. Indeed, conglomeration by large firms appears to have held industrial concentration in the economy about constant, while increasing macro-economic concentration since World War II.

Manifestly, it is industrial concentration that is directly related to the vigor of competition. Macro-economic concentration need not be of concern as long as the number of giant diversified corporations is large enough to preclude overt or tacit collusion among them. Because it takes more than one hundred corporate giants to account for even a half of all manufacturing assets in the nation, we are far from the possibility of non-competitive behavior because of inadequate numbers.

In general, conglomerate mergers are likely to invigorate competition. By strengthening the managerial and financial support available to each of its constituents, the conglomerate is able to make each a more energetic competitor in the industry in which it operates. Each entity can draw upon the conglomerate's pool of specialized managerial talent, utilize its management science, obtain financial assistance, and assume a more innovative and risk-taking posture than it could as an independent firm. Conglomeration can thus transform simple competition into multiple competition.

Beyond this, the conglomerate is more likely to possess the financial and other resources needed to enter additional industries, theretofore closed to its smaller constituents. Established firms in those industries will, as a result, tend to behave more competitively than before in pricing their products in the hope of deterring the potential competition of the conglomerate. It has been aptly said that the conglomerate "sits on the edge of any and all markets," ready to enter, and thus keeps the Establishment on its toes. Indeed, a German economist has interpreted the conglomerate merger as a self-correcting force in American capitalism, making it more competitive and denying the Marxian prophecy of increasing monopoly. Certainly, enhanced potential as well as actual competition can be an important social gain.

While conceding the probability that conglomeration energizes competition, many observers contend that large diversified corporations may engage in predatory or other kinds of conduct prejudicial to small firms. Several arguments are advanced.

It is said that the large conglomerate can engage in cut-throat or predatory pricing in one of its lines of business, subsidizing temporary losses from profits earned in other lines until its smaller competitors are driven from the field. In practice, instances of cross-subsidization are rare. Not only does it violate federal and state anti-monopoly laws but it flies in the face of accepted principles of management. In a multi-industry company it is not feasible to force the manager of one division or subsidiary to operate unprofitably when this requires abandonment of established targets and management incentive plans. Also, unless barriers to entry of new firms are very high, the subsidized division cannot reap monopoly profits once its competition has been eliminated, because its efforts to raise prices will attract new competitors and deny it an opportunity to recoup its losses.

Somewhat related to the "cross-subsidization" argument is the idea that the large financial resources of the conglomerate (its "deep pocket") enable it to enage in nonpredatory but temporarily losing activities, such as expensive product development or large-scale advertising that smaller competitors are unable to finance, which ultimately give it the competitive edge in the market. While there may be truth to the contention, the advantage of the larger firm arises from superior resources and not from conglomeration. Unless one believes that public policy should protect smaller firms at any cost, one cannot object to product and market development activities which are in the consumers' interest, even though they are open only to enterprises with ample financial means.

Yet another standard objection to large firms, whether or not conglomerate in nature, is that they achieve such important advantages of scale that they raise the barriers to entry into an industry. Here again there is truth in the argument. Conglomeration as well as other modes of business diversification can enable the surviving firm to benefit from reductions in risks or costs through enlargement of operations. By increasing the stakes in the industrial game they make it harder for poor players to survive. If these economies are real, society benefits - provided that competition remains effective and obliges the conglomerate to pass the economies along to the public via lower prices or product improvements. Few will defend the perpetuation of inefficient small-scale firms at heavy cost to the public. What is important is that a sufficient number of firms remains in each industry to discipline each other.

The possibility that the conglomerate firm will cause its constituents to practice commercial reciprocity, to the disadvantage of its small competitors, is usually mentioned in assessing the effects of mergers upon competition. If intradivisional sales are made on competitive terms, there can be no complaint. Is it realistic, however, to expect the manager of one division of a conglomerate to do business with another division on unfavorable terms, counting upon recouping the loss by selling the other division some of his own product at higher than competitive prices? The answer is negative because, as previously noted, it violates basic principles of management.

Business reciprocity can also be practiced in purchases and sales among different companies in such subtle ways as to escape detection by antitrust authorities. However, there is no clear evidence that conglomerates are more culpable than other large firms. Corporate systems of incentive and control normally delegate to divisional managers the authority to buy and sell in the cheapest market.

Finally, there is concern that conglomeration may be a new route to dangerous aggregations of economic and political power in American society. A competitive democratic order manifestly requires an adequate dispersion of power. Citizens and lawmakers must remain vigilant to stop undue concentrations of all kinds. It has frequently been noted that over the sixteen-

year period of 1947-63 the top two hundred corporations expanded their share of total value added in American manufacturing from thirty to forty-one per cent, and that by 1963 the hundred largest firms had a greater share than was held by the two hundred largest in 1947. There are, nevertheless, reasons for believing that macro-economic concentration is not at a dangerous level. Although reduced, the number of large manufacturing corporations remains so large as to preclude the possibility of oligopolistic behavior. Levels of industrial concentration have not risen, and they are the relevant criteria for judging competition, as the 1964 guidelines published by the Attorney General recognized.

American courts have consistently held that large size is not, per se, an offense against the anti-trust laws. If corporate giantism were anti-social the government should long ago have proceeded to break up the larger nonconglomerate giants. In a ranking of 130 members of the "billion dollar club" in descending order of their 1968 sales revenues, the five largest conglomerates were International Telephone and Telegraph, 14th; Ling-Temco-Vought, 30th; Tenneco, 45th; Litton, 48th; and Textron, 59th. If public policy required a dismantling of these largest conglomerates, some fifty-four other giants should first be broken up. Only eight conglomerates ranked among the two hundred largest manufacturing corporations.

Conglomeration helps to keep down industrial concentration in manufacturing and mining, in the face of rising macro-economic concentration. For any assumed level of macro-economic concentration, a population of conglomerate firms will produce lower average industrial concentration than would a population of single-industry or concentric firms. This is shown by a simple hypothetical example: American manufacturing is classified by the Census Bureau upon a basis of product line into 470 "industries," which are aggregated into twenty-one "major manufacturing groups." Let us arbitrarily - but not entirely unrealistically - assume that "industries" define competitive markets in the sale of products and that each "major manufacturing group" embraces "related" products as the word is used herein. Assume further that macro-economic concentration rises greatly to the point that <u>all</u> manufacturing activity is carried on by five hundred giant corporations. What kind of corporate structure will minimize industrial concentration and maximize the probability of effective competition at the industrial level? There are three major alternatives:

(a) <u>A single-industry structure</u>, under which there would be on the average about one firm in each of the 470 industries.

(b) <u>A concentric firm structure</u>, under which there would be on the average about twenty-four firms in each of the twenty-one major manufacturing groups and 470 industries.

(c) <u>A conglomerate firm structure</u>, under which all five hundred firms could conceivably compete in every one of the 470 industries.

Under the assumed high level of macro-economic concentration, a single-industry structure would result in widespread monopoly. Even a concentric firm structure might leave some industries highly concentrated. Only a conglomerate firm structure would provide high assurance of effective competition.

VII

Other Potential Effects

Corporate conglomeration can have, at least potentially, important effects upon the role of internal financing of business, upon investment policies, upon the relationship of banking to industry, and upon the process of allocating investment among industries.

Conglomeration tends to increase the role of internal financing of business enterprises by reducing the firm's reliance for funds upon external sources. In an industrially diversified firm, some divisions may be throwing off cash. The aggregate demand for external funds by the conglomerate will fluctuate less through time than will the demand of an equally large but more highly specialized firm. Other things being equal, conglomerates will have less recourse upon the commercial banking system for short-term financing.

Another likely, but still largely potential, consequence of conglomeration is a restructuring of inevestment portfolios. If a rising proportion of publicly owned corporations conglomerate, each incorporating the principle of portfolio diversification, managers of mutual funds, trust officers, and individual investors will find it less necessary to diversify their portfolios. Thus an investor might achieve the same protection against extreme fluctuations in the value of and income from his holdings by buying one million dollars' worth of stock in International Everything, Inc., as by buying fifty thousand dollars' worth of stock of companies in each of twenty industries.

Another potential effect of conglomeration is to bring commercial banks and industrial corporations under common control. Already, several industrial conglomerates have acquired commercial banks. The more popular route, however, is use of the "one-bank holding company" to acquire financial and industrial enterprises. A one-bank holding company is created when a sponsoring commercial bank issues stock of a new holding company to its shareholders in exchange for their present shares. The primary motive is to acquire a corporate vehicle able to diversify into financial services not open to commercial banks, such as computer leasing, credit cards, mortgage banking, or sale of mutual investment shares. Up to the end of 1968 some thirty-four of the nation's largest banks holding over one hundred billion dollars of deposits had formed such holding companies. Unlike chains or groups of banks controlled by bank holding companies, which are prohibited by the Bank Holding Company Act of 1951 from acquiring nonfinancial enterprises, one-bank holding companies are unregulated and able to enter nonbanking activities.

A serious potential consequence of conglomeration could be a worsening of resource allocation in the economy as a result of less accurate knowledge of returns to investment in different industries. Most conglomerates report their sales and net profits in the aggregate; they do not publish for investors for financial results of their operations in each industry or industrial group. The relative profitability of different lines being unknown, investors are unable to allocate their funds among industries with as much knowledge as they would possess in a nonconglomerate world. More and larger errors are likely to be made. Society will lose from a less efficient use of scarce capital.

* * * * *

II.

CORPORATE ROLE IN DIVERSIFIED COMPANIES

by Norman Berg
(HBS 71-2 BP 2)

The Study

The field research was undertaken . . . in the effort to determine whether the very different organizational approaches of the two large diversified companies in which the researcher had had the opportunity to do clinical research were representative of broader classes of companies or simply "one of a kind" situations. Since these two companies were excellent examples of two broadly different strategies of diversification which have been followed in American industry, it seemed appropriate to construct groupings of companies with similar administrative histories, with possible similarities and differences in the approaches to corporate organization to be determined. The hope was to include in each category companies which had "stabilized" at a certain approach to organization, and not companies that were still making the transition from the extremes of either a holding company or a functionally organized pattern of operation.

Companies chosen for inclusion in the group called "diversified majors" were selected because they had become diversified largely by the means described by Chandler:

1. As part of a long-term trend, starting in the 1920s;

2. With a characteristic pattern of

   a. Initial expansion and accumulation of resources in a single business,
   b. Rationalization in the use of resources,
   c. Expansion into new (often related) markets and lines to help assure the continuing full use of resources, and
   d. Development of new administrative structures to deal with the new management problems.

Companies selected for inclusion in the "conglomerate" group were chosen because they had become diversified in a different manner, as well as much more recently, than the diversified majors. It was intended that companies in this group would generally have

1. Achieved most of their growth and diversification within the last 5-15 years,

2. Followed a characteristic pattern of expansion

a. Largely by a series of acquisitions, rather than internally generated diversification,
b. Often into widely unrelated areas,
c. Often by means of aggressive financial policies rather than with excess resources, and

3. Shown serious interest in contributing to the operating performance of their acquisitions, even though there was considerable variation in the financial and acquisition policies of the companies in the sample.

In addition, it was hoped that companies in both groups would be primarily manufacturing oriented, with the bulk of their business in the United States, and would be between about $500 million and $2 billion in size.

A total of eighteen companies were contacted with regard to assisting in the project. Three declined, and in another the illness of the president made the request inconvenient. Data from four companies were not used. One company that was thought to be in the diversified major category proved to be too strongly influenced by its relatively recent emergence from being primarily a chemically based company. Data from three companies that were clearly in the conglomerate category were not used because, as the project developed, their size and age characteristics made them less suitable for inclusion in the conglomerate group, as they were in the $100-$300 million category and were less than five years old.

The companies from which usable data were obtained, along with a brief statistical summary of each of the companies, are shown in Table 1 on the following page.

In terms of overall characteristics of the two groups, then, the important points for our purposes are:

1. All of the companies (except "Y," which is not included in the averages) were in the $500 million to approximately $2 billion sales range.

2. The average size in the conglomerate group was about $1.4 billion, or about 40% larger than the approximately $1 billion for the diversified major group.

3. Companies in the conglomerate group were much more diversified than their counterparts, with an average of 70 4-digit SIC numbers as compared to 30 for the diversified majors.

Table 1

STATISTICAL DATA
ON COMPANIES

STATISTICAL DATA / COMPANIES	1969 Sales (million $)	1969 Fortune Rank	1969 Assets (million $)	1969 Employees (thousands)	1969 Number of Divisions	1969 4-Digit SIC #	Approx. # Acquis. 1959-69	1959 Sales (million $)	1959 Fortune Rank
DIVERSIFIED MAJORS:									
Bendix	$1,468	72	$ 980	63.5	53	30	16	$684	62
Borg-Warner	1,087	108	949	41.6	35	25	3	650	68
Ingersoll-Rand	711	160	690	33.7	27	31	11	162	269
Company "X"	About 500	-	-	-	-	About 35	n/a	-	-
Average	About 1,000	-	-	-	-	About 30	-	-	-
Company "Y"	See text for comments		-	-	-	About 50	n/a	-	-
CONGLOMERATES:									
Gulf & Western	$1,564	64	$2,172	85.0	37	89	45	-	-
Kidde (W.J.)	786	143	775	35.7	55	n/a	74 ('64-69)	$ 41	-
Lear-Siegler	587	186	319	26.6	56	40	50	87	431
Litton	2,177	39	1,580	116.0	70	64	80	126	322
Textron	1,682	57	895	70.0	32	85	55	308	146
Average	$1,359	98	$1,148	66.6	50	70	61	-	-

Source: _Fortune_ 500 Survey, plus company data on divisions, SIC codes, and acquisition. N/A = not available.

Summary of Findings

The results of the field research are shown in the next two pages in numerical form (Table 2) and in simple graphic form (Figure 1). The most striking conclusion to be drawn directly from the date is the substantial similarity within groups and differences between groups with regard to the emphasis accorded R&D, marketing, manufacturing, and purchasing functions at the corporate level. None of these functions (with one exception in the case of purchasing) were represented at all at the corporate level in the conglomerates; in only three cases were any of these four functions not represented at the corporate level in the diversified majors. The greatest difference was in terms of numbers in the R&D function, with an average of 151 in the diversified majors and 0 in the conglomerates.

The diversified majors had, on the average, more than three times as many people at the corporate level as the conglomerates. Part of this difference was represented by the great disparity in the emphasis accorded R&D, marketing, manufacturing, and purchasing, as pointed out above, but the average number of professionals in the other six categories listed was, without exception, lower for the conglomerates. Not only did the conglomerates refrain completely from undertaking four major activities at the corporate level, then, they were also more thinly staffed than the diversified majors in all of the remaining activities.

Both the finance and control functions represented a significantly larger proportion of the total corporate effort in the conglomerates (56% and 25%, respectively) than in the diversified majors (28% and 19%). In terms of the average number of people involved, however, the conglomerates had only about 60% as many as the diversified majors.

These contrasts are heightened by the facts that the sales for the average company in the conglomerate group were 40% larger than for the average diversified major, and that the conglomerates were both more diversified and had more divisions than the diversified majors. In addition, the group averages were based on the five companies in the conglomerate group but for only the four companies named in the diversified major group. The effect of including Company Y in the group averages, as shown in the last column of Table 2, would be to more than double these averages for almost every organizational category, accentuating in a dramatic but perhaps misleading way the contrast between these two groups of companies.

It is important to note that the figures by no means include the total corporate effort in any one of the areas listed, as they do not include activities at the group or division level. Neither do they allow for variations in the amount of outside services purchased. It was originally hoped that a way could be found to summarize the functions and people at the group levels as well, thereby getting a more accurate picture of the total of the functions and people within the company but "above" the level of the division manager. The complexity and variation in practices at the group level dictated a deferral of this effort, however, even though much of the data was collected.

Table 2

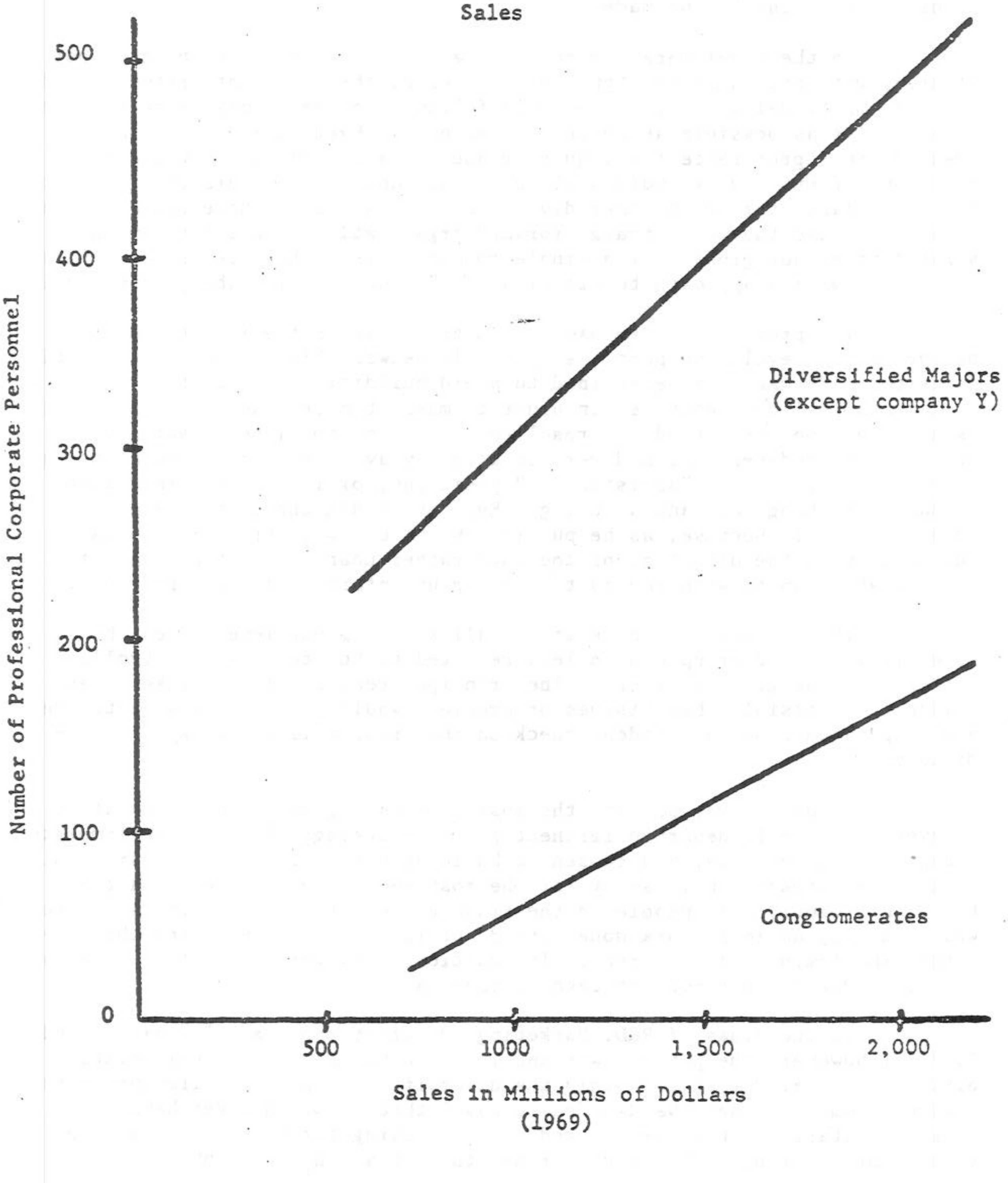
ORGANIZATIONAL DATA
ON COMPANIES

COMPANIES / FUNCTIONS	DIVERSIFIED MAJORS							CONGLOMERATES						
	Company				Four Cos:			Company					Five Cos:	
	A	B	C	X	Total	Avg.	"Y"	F	G	H	I	J	Total	Avg.
General Executives	5	5	4	2	16	4	23	4	1	4	3	14	26	5
Finance	28	61	101	144	334	84	582	8	22	29	91	106	256	51
(of which Control)	(10)	(36)	(78)	(107)	(231)	(58)	(424)	(6)	(12)	(8)	(38)	(49)	(113)	(23)
Legal-Secretarial	4	10	22	42	78	20	92	1	7	5	6	66	85	17
Personnel Adm.	11	6	20	25	62	16	90	1	2	3	10	20	36	7
Research & Dev.	54	130	139	232	555	139	1012	0	0	0	0	0	0	0
Marketing	5	0	34	0	39	10	101	0	0	0	0	0	0	0
Manufacturing	5	1	0	5	11	3	190	0	0	0	0	0	0	0
Public Relations	1	6	9	16	32	8	45	5	3	5	6	9	28	6
Purchasing & Traffic	10	1	33	4	48	12	30	0	0	0	2	0	2	0
Corporate Planning	3	3	2	6	14	5	8	5	4	1	7	9	26	5
TOTALS	126	223	364	476	1,189	297	2173	24	39	47	125	224	459	92

Note: Numbers shown indicate professional personnel in corporate functions as determined from field research. See Exhibit 8 for notes on definition and classification of data.

Figure 1

Corporate Personnel
vs
Sales



Source: Tables 1 and 2. Points are not shown in order to avoid identifying companies. Straight lines were fitted to the data by means of the method of least squares.

Comments on Companies

Although detailed comments on individual companies which would tend to identify the companies would not be in order, a number of observations can nevertheless be made.

In the conglomerate group, Company H seemed to have the clearest strategy with regard to the types of businesses they were interested in and the organizational approach they would follow in order to make each division as effective as possible as an individual unit. Executives had often expressed their preference for acquiring and operating divisions which could function effectively as individual units, and not as customers of, suppliers to, or collaborators with other divisions. Perhaps as a consequence of the above, they had the most straightforward organization of all the companies visited in either group. If a single company were to be selected to typify the "conglomerate approach to organization," H would serve the purpose well.

The president often had stated his views on the importance of having as few levels and people as possible between himself and the operating divisions. He was also determined to avoid building up staff units and assistants to line executives in order to make it more likely that important issues could be identified and resolved quickly by the line organization. He, and his predecessors, had very consciously avoided building up existing corporate staff units, "assistant to" positions, or functionsl areas such as R&D, marketing, or manufacturing. Even the audit and control area was relatively small because, as he put it, "We have always preferred to take our chances in the direction of too much rather than too little trust of the operating units with regard to keeping us informed of their problems."

This company had no staff at all at the group level; even the recently appointed group controllers reported to the corporate controller rather than the group officers. The principal reasons were to make it as unlikely as possible that "issues or problems would get lost or side-tracked," and to provide some independent check on the group officers as well as the divisions.

Company J was perhaps the most interesting of the conglomerates, however, because it departed farthest from the averages for the conglomerate group as a whole. They had chosen to build up their staff very considerably in selected areas: they had by far the most general executives, and they had significantly more people in the Finance area, the Legal section (there was virtually no legal work done outside or in the divisions), and the Personnel and Administration areas. In addition, they were above the averages for the diversified majors in each of these areas.

In the areas of R&D, Marketing, Manufacturing, and Purchasing and Traffic, however, the pattern was consistent with the other conglomerates again, and clearly different than the diversified majors. A director of the company commented that "we decided on Day 1 that we would never have any corporate staff in these areas, and so far nothing has happened to make us change our thinking." One could argue, then, that this company had gone

farther than any of the other conglomerates in building up a corporate staff effort similar to the diversified majors, except in the critical areas of R&D, marketing, manufacturing, and purchasing and traffic. They seemed to be very consciously mixing the two approaches, and the evolution of this company should be most interesting to observe.

More variation in both the strategy of diversification and the organizational approach adopted to deal with it was found in the diversified majors, and summary statements are more difficult to make about this group. The organizational functions were more complex and difficult to explain to an outsider. It is tempting to use the evolutionary analogy of a later and more highly developed organism, but this seems more misleading than helpful with regard to understanding the present differences or making any predictions about the future development of these organizations.

In terms of the history of diversification, for example, one of the comapnies had gone through a considerable acquisition phase some 30-40 years ago, had continued to diversify but had operated with a very small corporate staff for a long period of time, and was still in the process of building up functions and people at the corporate level. The president commented:

> When we were formed back in the late twenties, we ran largely as a holding company for a while. We added financial controls first but didn't begin building up in other areas until much more recently. I don't anticipate anything in the marketing or manufacturing areas, but we are currently engaged in a study just like you are doing to find out how some other companies are approaching these corporate organizational questions. At present, we are especially interested in defining our role with regard to EDP, Financial Analysis, and Strategic Planning.
>
> My approach is influenced, of course, by how I have defined my job as well as my own preferences and "style." I think my job is to do all I can to insure that we are making the right decisions as a corporation on the businesses that we get into and get out of, and that our divisions are doing the best possible job in the business they are in. My personal preferences are to have the fewest but best people possible at the corporate level.

Another of the diversified majors, however, was still in the process of cutting down on their headquarters staff. A vice president commented:

> We really started to move away from our fifty-year-old functional approach about five years ago. Our total for headquarters personnel has declined from 1,000 to 400 in the last several years, even though the number of plants we operate has increased more than six times. Our most recent changes have been to break up and move the accounting, credit, and marketing functions out to the divisions.

The unique administrative history of each company, and especially the diversified majors, is clearly of major importance in understanding the reasons for the present approach to organization. In spite of this factor, however, the differences between the two broad groups of companies are great. We will turn next to a discussion of these differences between the groups.

Comments on Group Differences

The data show clearly that there are considerable similarities within groups and differences between groups with regard to the functions undertaken and the emphasis accorded those functions at the corporate level. Before turning to the implications of this for research and administration, we will explore a few of the possible reasons for the differences. Since the conglomerates represent a more recent development than the diversified majors, it will be useful to describe the differences primarily in terms of why the conglomerates differ from the diversified majors.

Companies in the conglomerate group have, by definition, recently acquired independent businesses; the diversified majors more often developed their divisions internally. In the one case the division manager or entrepreneur and his staff already existed; in the other they had to be created as the functions were taken away from the existing corporate staff. Simply following the path of least resistance in each case would lead in the direction indicated by the data, especially in those cases where a "strong" manager came with the acquisition.

Although the differing histories are clearly important, it does not seem likely that it is the sole factor, or perhaps even the major factor, responsible for the differences. A number of the conglomerates have been of significant size for five or ten years, and have had the opportunity to build staff if they thought it advantageous. No systematic attempt was made to obtain comparable detailed historical figures, as generally they were not readily available. Without exception the executives providing the information had intimate knowledge of the general development of the corporate organization over a number of years, though, and although all reported some modest increases in staff, none felt that drastic changes had occurred in the recent past.

In addition, none of the conglomerates foresaw much of a build-up in any areas, and several were very explicit about not taking on any of the major functions they were not now performing. One of the older and larger of the conglomerates, for example, was at the time of this research engaged in planning their corporate office space requirements for a number of years in the future due to the scheduled move to a new office building shortly. Their corporate organization had changed very little in terms of functions or numbers for at least the last five years, and they were projecting less than a 10% increase in numbers and no addition in functions at the corporate level. Another, which had had a net increase of only two people at the corporate

level in the preceding two years, during which the sales had increased by about 50%, had no plans for increasing their staff. A third thought that they might actually reduce the number at the corporate level as "we rationalize our operations and develop more professional managers in the divisions."

It is true, of course, that the skills and interests of the one or two top men in many conglomerates have been more financial than operating. This could easily have resulted in a low priority given to the establishment of those corporate functions more concerned with operations than finance, as many observers have noted. In addition, during most of the 1960s, a variety of factors combined to make acquisitions a much faster and easier path to growth than improvement of operations,[1] which could make efforts devoted to managing the divisions seem relatively less rewarding.

. . . . .

Another important reason for the differences is in the philosophy and background of the top managers in the conglomerates.[2] They have written and spoken at great length about the virtues of their "lean" organizations and the emphasis they place on seeing to it that their divisions are well managed rather than in taking an active part in their management. Many have been very explicit about seeing their role with regard to the divisions as providing a greater financial resource for the newly acquired company; relieving the manager of "corporate" tasks such as dealing with the SEC, the financial community, and stockholders, thereby freeing the division manager to concentrate on the design, production and marketing of his products; recognizing the need for and providing some help in installing "modern management methods" in basic areas such as financial controls and manufacturing policies; and finally providing an organizational framework, planning format, and system of incentives that can both motivate and prod the divisions' managements into doing an effective operating job.

Many conglomerate managers seem to believe their approach is more effective, and attracts better managers, than the more "bureaucratic" approach of the diversified majors. They see their lean staff as a virtue to be retained as long as possible, not a weakness to be overcome as they become more "mature."

The importance of creating a climate which entrepreneurs will find attractive at the division level is constantly emphasized, and the avoidance of a large corporate staff is seen as essential in creating such a climate. Since the theme is so often emphasized, and is supported by the data collected, it seems reasonable to at least consider that it may be an explanatory

[1]Neil Jacoby, "The Conglomerate Corporation," The Center (for the Study of Democratic Institutions) Magazine, Volume II, Number 4, July 1969.
[2]See, for example, Dan Carroll, "What Future for Conglomerates," Harvard Business Review, May-June 1969.

variable of some importance. It is not just the fact that conglomerates acquired companies with complete staffs that is significant, then, but also the fact that conglomerate managers appear to believe and behave as though it is important to leave much of the staff effort at the division level.

Another important explanation for the differences found is surely in the nature of the businesses the particular diversified companies are engaged in. "Comparable size and diversity" can be a deceptively misleading term with regard to the management approaches appropriate for specific companies. Although the administrative history and management philosophy are likely to be important, there is no doubt more opportunity or need for centralized staff services for some businesses and combinations of businesses than others. To the extent that the diversified majors as a group tend to be in businesses that are more closely related to each other in terms of the customers served and the manufacturing skills and technologies involved, for example, than those of the conglomerates, regardless of quantitative measures of diversity, there will likely be more opportunity to apply corporatewide the efforts of a larger and more expensive corporate organization.

* * * * *

III.

DIVERSIFICATION TABLES

Table 1

Product Lines of the 200 Largest Manufacturing Firms in the United States, 1973

Rank	Firm	Herfindahl Index[1] 1960 3 dig.	1965 3 dig.	1965 2 dig.
	SIC 20: Food and Kindred Products			
74	General Foods, 20:88% 204[2] 202, 203, 205, 206, 208, 283, 284, 289, 514, 518	.7904	.7752	.2735
90	Borden 20:61%; 28:22% 202 203, 205, 206, 208, 209, 204, 282, 284, 285, 286, 289, 514, 581	.3627	.7307	.3659
98	Coca-Cola 2086 203, 209, 358, 514	.2180	.4853	.0000
99	Kraftco 20:97% 202 201, 203, 207, 208, 209, 265, 289, 307, 322, 342, 363, 374, 514	.5248	.6073	.0838
107	Joseph E. Seagram & Sons 2085 208, 291, 518	.5893	.2325	.2277
109	United Brands 017 201, 203, 204, 282, 286, 307, 514			
112	CPC International 20:69% 204 203, 205, 206, 207, 209, 284, 287, 289, 514, 581	.4410	.5704	.0563
118	PepsiCo 20:77%; 39:10% 2086 204, 394, 411, 514, 751	.0581	.0000	.0000
122	Ralston Purina 20: almost 100% 204 207, 209, 282, 287, 514	.3050	.6325	.1908

[1]The Herfindahl Index is a measure used by economists to illustrate the extent to which a company is diversified. An index reading of .0000 is an undiversified company. A reading of .999 is maximally diversified.

[2]The numbers which appear along with the names of the corporations in these Diversification Tables provide an indication of the variety of products which the corporation in question markets. The two-digit groups (such as, for example, 20--Food and Kindred Products or 28--Chemicals and Allied Products) are the most general manufacturing aggregation. Three-digit numbers indicate sub-sectors of two-digit groups. Four-digit numbers are sub-sectors of three-digit groups, etc. Thus, as noted, major group 20 is comprised of Food and Kindred Products. Three-digit sub-group 202 is Dairy Products. Four-digit industry 2021 is Creamery Butter.

Table 1 (continued)

Rank	Firm	Herfindahl Index 1960 3 dig.	Herfindahl Index 1965 3 dig.	Herfindahl Index 1965 2 dig.
	SIC 20: Food and Kindred Products (continued)			
124	Norton Simon 20:57%; 28:16% 207 201, 203, 208, 284, 272, 275, 322, 341, 355, 365, 399, 483, 512, 781			
125	Esmark 20:89%; 28:6% 201 202, 204, 207, 209, 281, 284, 287, 291 311, 514	.5075	.4656	.2611
126	Beatrice Foods 202 201, 203, 205, 206, 208, 209, 22,23, 251 285, 286, 316, 355, 363, 3714, 375, 422 504, 508, 514, 516, 021, 125	.3832	.5953	.0441
134	National Distillers & Chemical 20:48%; 28:21% 2085 204, 281, 282, 286, 222, 228, 514, 518	.6906	.8165	.7462
136	Consolidated Foods 20:60% 203 201, 205, 206, 208, 209, 232, 233, 238, 251, 264, 275, 277, 284, 306, 354, 363, 394, 399, 502, 533, 514, 541, 581, 734			
150	General Mills 20:75%; 23:10%; 39:10%; 28:4% 204 201, 205, 206, 209, 233, 394, 396, 283, 286, 514, 581, 596	.6126	.6419	.2674
151	Nabisco 205 202, 204, 206, 284, 283, 394, 514	.2701	.3855	.0960
155	H. J. Heinz 20:100% 203 201, 205, 209	.5347	.5810	.0000
164	Standard Brands 20: almost 100% 209 201, 203, 204, 206, 207, 208, 306, 329, 514, 518	.8089	.8081	.2580
168	Carnation 202 203, 201, 204, 341. 024, 514	.6131	.6447	.1617
189	Anheuser-Busch 20: almost 100% 2082 201, 204, 209, 518, 799	.7692	.7350	.4537
177	Campbell Soup 20:100% 203 201, 204, 205, 206, 209, 514, 581, 599	.3750	.5121	.0000
197	Quaker Oats 20:72% 204 201, 205, 206, 209, 222, 223, 286, 394, 514	.4130	.6674	.2169

Table 1 (continued)

Rank	Firm	Herfindahl Index 1960 3 dig.	1965 3 dig.	1965 2 dig.
	SIC 28: Chemicals and Allied Products			
18	E.I. Du Pont de Nemours 28 more than 80% 286 281, 282, 283, 284, 285, 287, 289, 306, 307, 369, 516	.7788	.7808	.3355
22	Union Carbide 28:79% 281 282, 286, 287, 289, 307, 333, 391, 516	.8794	.8595	.7546
24	Dow Chemical 281 282, 284, 286, 287, 307, 333, 335, 516	.6520	.9200	.8189
35	Procter and Gamble 28:70%; 20:23% 284 204, 207, 209, 264, 516	.7330	.7496	.6303
40	Monsanto 28:86% 286 281, 282, 283, 284, 287, 291, 307, 358, 516	.8253	.8181	.5699
55	W. R. Grace 28:48%; 20:21% 286 282, 283, 287, 203, 205, 206, 209, 262, 291, 307, 314, 3714, 384, 102, 103, 441, 516, 581, 594	.8243	.8928	.7105
69	Allied Chemical 28:78%; 29:15% 281 282, 286, 287, 291, 222, 307, 331, 3714, 121, 131, 516	.4567	.7746	.5776
72	Celanese 28 c.a. 85% 282 283, 285, 286, 289, 261, 307, 347, 349, 356, 364, 329, 516	.4518	.6567	.2981
92	American Cyanamid 287 281, 283, 284, 286, 289, 251, 307, 327, 384, 152, 154, 651, 655, 516	.8488	.8415	.4142
97	Prizer 28 almost 100% 283 281, 284, 287, 384, 516, 512, 516	.5667	.541	.2862
100	Warner-Lambert 283 284, 206, 342, 358, 383, 384, 516, 512, 516	.8247	.7249	.5392
114	Olin 28:30%; 34:22%; 26:19% 281 282, 286, 287, 343, 344, 346, 262, 263, 264, 265, 152, 154, 516	.8873	.9142	.7252
117	Colgate-Palmolive 28 c.a. 90% 284 283, 287, 239, 264, 307, 384, 394, 221, 516	.2975	.3200	.0000

Table 1 (continued)

Rank	Firm	Herfindahl Index 1960 3 dig.	Herfindahl Index 1965 3 dig.	Herfindahl Index 1965 2 dig.
	SIC 28: Chemicals and Allied Products (continued)			
123	American Home Products 28 c.a. 70%; 20:21% 284 284, 285, 287, 206, 209, 342, 514, 516, 512	.6321	.6675	.5294
130	Hercules 28 c.a. 70% 286 281, 282, 284, 285, 287, 289, 209, 262, 307, 355, 364, 376, 516	.7316	.7686	.3154
133	Eli Lilly 283 284, 287, 307, 512, 516	.1247	.2027	.2027
140	NL Industries 28:39%; 33:32% 34:24% 281 282, 285, 286, 333, 343, 345, 346, 516	.8578	.8467	.6337
141	Merck 283 281, 284, 286, 287, 289, 207, 358, 516, 512	.5335	.4477	.0130
142	Williams Companies 287:45%; 33:18% 287 331, 461, 51, 53			
144	Squibb 28:83% 283 284, 201, 206, 516, 581, 512			
146	Bristol-Myers 28 almost 100% 284 283, 399, 516	.4082	.5247	.0641
159	Rohm and Haas 28 almost 100% 282 283, 286, 287, 307, 516	.6763	.7475	.0799
163	Diamond Shamrock 28:65%; 29:24%; 10÷ ≅3:10% 281 282, 283, 286, 291, 299, 101, 102, 121, 131, 204, 307, 516	.5184	.7427	.5298
167	Texasgulf 281 287, 193, 147, 241, 242, 243, 291, 333, 516			
178	Foremost-McKesson 28:49%; 20:48% 283 (40%) 284, 202, 512, 514, 516, 518, 591, 651, 655	.4932	.4352	.0000
182	Avon Products 284 (almost 100%) 391			
186	Ethyl 28:50%; 30:21%; 26:15%; 33:14% 286 281, 282, 289, 307, 262, 333, 385, 516			

Table 1 (continued)

Rank	Firm	Herfindahl Index 1960 3 dig.	1965 3 dig.	1965 2 dig.
	SIC 28: Chemicals and Allied Products (continued)			
189	Abbott Laboratories 28: almost 100% 283 284, 287, 306, 307, 384, 385, 516, 512	.5625	.7312	.6639
198	Stauffer Chemical 28: almost 100% 281 282, 286, 287, 355, 516	.5191	.5383	.2516
199	GAF 28:35%; 38:26%; 32:18% 286 281, 282, 386, 327, 329, 229, 276, 357, 369, 3714, 516	.8047	.8153	.6602
	SIC 35: Machinery, Except Electrical			
5	International Business Machines 357 276, 369, 508, 651, 655, 737, 739, 154	.5373	.4990	.4783
30	Xerox 357 271, 272, 273, 276, 366, 369, 508, 737, 739			
34	International Harvester 35:95% 352 (83%) 351, 353, 229, 331, 371, 372, 376, 508, 614, 631	.8237	.7904	.6431
39	Honeywell 357 358, 348, 349, 361/2, 364, 366, 369, 372, 376, 381, 382, 383, 384, 386, 171, 173, 508, 506, 737, 739, 762, 769, 891	.8502	.8599	.7305
47	Caterpillar Tractor 352 351, 353, 354, 356, 362	.4225	.5747	.0000
61	Singer 3636 354, 355, 357, 366, 251, 382, 508, 594, 829	.7455	.8672	.6912
64	Sperry Rand 35:70% 357 352, 356, 358, 363, 366, 369, 382, 508, 737	.8758	.8666	.7450
65	NCR 35: almost 100% 357 276, 355, 508, 737	.6763	.6914	.6883
68	Control Data 357 276, 508, 615, 641, 737, 739			
70	Deere 35: almost 100% 352 (c.a. 75%) 351, 353, 379, 508, 614	.5188	.4962	.1740

Table 1 (continued)

Rank	Firm	Herfindahl Index 1960 3 dig.	1965 3 dig.	1965 2 dig.
	SIC 35: Machinery, Except Electrical (continued)			
77	Burroughs 357 355, 276, 367, 395, 508, 737	.3141	.1892	.1863
101	FMC 35:45%; 28:44%; 34:11% 355 351, 352, 353, 356, 358, 281, 284, 287, 332, 348, 349, 371, 373, 374, 501, 508	.8264	.8743	.7165
111	Teledyne 355 354, 356, 358, 333, 335, 346, 363, 366, 372, 382, 384, 394, 508, 631, 632, 633, 739, 891			
135	Ingersoll-Rand 35: almost 100% 353 (68%) 351, 354, 355, 356, 342, 346	.8148	.8185	.2778
137	Studebaker-Worthington - Studebaker Worthington 356, 351, 352, 354, 358, 284, 289, 291, 304, 307, 329, 344, 361/2, 363, 364, 3714, 372, 376, 374, 382, 508, 615, 981	.8045 .8108	.7724 .8654	.5559 .6568
149	Allis-Chalmers 35:80%; 36:20% 353 351, 352, 355, 356, 358, 361/2, 379, 506, 508, 615	.8394	.85615840	
157	Babcock & Wilcox 351 356, 358, 325, 331, 329, 343, 344, 346, 349, 361/2, 365, 3714, 508	.8346	.8844	.7801
160	Combustion Engineering 35:56% 358 353, 355, 356, 241, 321, 323, 329, 325, 332, 244, 346, 349, 361/2, 382, 508, 739, 891	.7200	.6834	.3698
162	Dresser Industries 353 351, 354, 355, 356, 358, 325, 329, 332, 344, 349, 361, 381, 382, 103, 138, 145, 147, 508	.8368	.8731	.6840
165	Clark Equipment 35: c.a. 85% 353 352, 355, 356, 358, 254, 332, 344, 367, 3714, 501, 508, 614, 615	.6053	.6976	.5697
174	Carrier 358 354, 356, 344, 372, 508	.6267	.4623	.3126
192	Otis Elevator 35: almost 100% 353 366, 375, 508	.0000	.0000	.0000

Table 1 (continued)

Rank	Firm	Herfindahl Index 1960 3 dig.	1965 3 dig.	1965 2 dig.
	SIC 36: Electric and Electronic Equipment			
6	General Telephone & Electronics 481/366 361/2, 364, 365, 367, 274, 307, 382, 506, 737	.8132	.8527	.4507
11	General Electric 361/2 363, 3-4, 365, 366, 367, 369, 351, 372, 376, 374, 506, 614, 615	.9211	.9325	.6214
19	Western Electric 366 334	.5692	.5397	.3427
20	Westinghouse Electric 261/2 363, 364, 273, 274, 281, 286, 344, 351, 358, 374, 382, 376, 152, 154, 483, 506, 651, 655	.9361	.9349	.6662
29	RCA 365 366, 227, 229, 273, 376, 482, 483, 506, 751	.6904	.7663	.4598
139	Motorola 366 365, 367, 376, 506, 781, 782	.6641	.7193	.1723
158	Texas Instruments 367 366, 357, 376, 382, 506	.8416	.8846	.7391
170	Whirpool 36: c.a. 90% 363 365, 358, 393, 506	.4986	.5054	.5054
183	Raytheon 36:71% 367 363, 366, 369, 273, 353, 355, 358, 376, 506, 739	.6813	.7858	.5411
201	Emerson Electric 361:2 363, 364, 365, 367, 354, 358, 372, 376, 506	.8618	.8156	.6149
	SIC 37: Transportation Equipment See the following page.			
	SIC 38: Instruments and Related Products			
21	Eastman Kodak			
45	Minnesota Mining & Mfg.			
113	Johnson & Johnson			
172	Polaroid			
	SIC 39: Miscellaneous Manufacturing Industries			
193	Armstrong Cork			

Table 1 (continued)

Rank	Firm	Herfindahl Index 1960 3 dig.	1965 3 dig.	1965 2 dig.
	SIC 37: Transportation Equipment			
2	General Motors 3711/13 3714, 372, 373, 374, 376, 379, 332, 351, 358, 363, 365, 501, 508, 551, 614, 615, 631, 632, 633	.7784	.7543	.6674
4	Ford Motor 3711/13 3714, 3715, 321, 352, 356, 363, 366, 152, 154, 591, 508, 551, 614, 615, 632	.6168	.6216	.6033
14	Chrysler 3711/13 3714, 372, 373, 376, 379, 307, 348, 351, 358, 171, 501, 507, 551, 614, 752	.4700	.5049	.4796
41	McDonnell Douglas 37:100% - McDonnall	.8333	.8000	.7500
	372 Douglas	.2960	.3445	.3445
	376, 737			
54	Rockwell International 37:56% 372 (28%-- 3714(28%), 376, 354, 356, 358, 365, 366, 367, 382, 501, 508	.6375	.8174	.8083
63	Lockheed Aircraft 37: almost 100% 372 373, 376, 366, 508	.8003	.7011	.6596
79	Boeing 37: 100% 372 (76%) 376 (21%), 373, 508	.3692	.4654	.4654
91	TRW 37:49% 3714 372, 376, 351, 354, 355, 358, 366, 367, 363, 362, 361, 382, 396, 501, 737, 891			
95	Bendix 372 3714, 372, 376, 379, 243, 244, 245, 354, 356, 358, 359, 365, 366, 382, 501, 508	.9268	.9317	.8199
96	Avco 372 3714, 376, 379, 273, 351, 352, 356, 359, 331, 365, 366, 382, 483, 501, 508, 614, 615, 651, 739, 781, 782, 891	.8598	.9038	.8261
101	Signal Companies 3713 3714, 372, 376, 307, 336, 351, 355, 382, 152, 154, 501, 508, 655	.7376	.6033	.5506

Table 1 (continued)

Rank	Firm	Herfindahl Index 1960 3 dig.	1965 3 dig.	1965 2 dig.
	SIC 37: Transportation Equipment (continued)			
106	United Aircraft 37: almost 100% 372 376, 351, 358, 361:2, 366, 367, 508	.3872	.2640	.2640
116	Borg-Warner 3714 251, 282, 285, 286, 307, 343, 344, 351, 355, 356, 358, 362, 365, 382, 501, 508, 614, 615	.8843	.8898	.7862
121	Eaton 3714 3713, 301, 332, 242, 345, 346, 349, 352, 353, 355, 356, 358, 359, 362, 504, 508	.6534	.8500	.7230
136	General Dynamics 37:65% 372 373, 376, 325, 327, 329, 344, 357, 365, 366, 367, 382, 111, 121, 508	.8053	.8879	.8648
152	Fruehaur 3715 3713, 3714, 372, 373, 376, 341, 344, 501, 551, 614, 615	.0861	.6091	.0938
166	AMF 375 3714, 373, 3719, 232, 245, 344, 347, 352, 353, 356, 358, 361, 362, 366, 367, 379, 382, 387, 394, 501, 508	.9241	.9337	.8519
181	American Motors 37N almost 100% 3711 3713, 3714, 307, 501, 551, 553	.2534	.2339	.2339
194	White Motor 37:66% 3713 3714, 352, 353, 501, 508	.2292	.7335	.6054
195	Dana 3714 373, 329, 346, 356, 359, 501	.6822	.8310	.6962

Table 2

Business Activities of Conglomerate Firms in the United States in 1979

SIC 2-Digit Industries

Rank	Firm	No. of Industries Mfg.	No. of Industries Non-Mfg.
Conglomerate Firms			
8	International Tel. & Tel. 20, 24, 25, 26, 27, 28, 30, 32, 33, 34, 35, 36, 37, 38, 01, 12, 13, 14, 15, 16, 17, 41, 42, 44, 47, 48, 50, 51, 54, 55, 59, 61, 63, 67, 70, 73, 76, 89	14	24
15	Tenneco 20, 22, 24, 26, 28, 29, 30, 31, 32, 33, 34, 35, 37, 01, 07, 13, 15, 42	13	15
42	Gulf & Western Industries 33, 34, 35, 36, 37, 38, 39, 10, 12, 14, 17, 42, 50, 51, 52, 53, 56, 58, 61, 62, 63, 64, 65, 67, 70, 73, 78, 79, 89	19	22
51	Litton Industries 25, 26, 27, 28, 33, 34, 35, 36, 37, 38, 39, 13, 15, 44, 50, 51, 73, 76, 89	11	8
66	LTV 20, 30, 32, 33, 34, 35, 36, 37, 40, 44, 47, 50, 51, 60, 67, 10, 12, 13	8	10
73	Illinois Central Industries 20, 24, 25, 27, 30, 32, 33, 34, 35, 36, 37, 40, 42, 45, 47, 50, 51, 54, 55, 57, 58, 59, 63, 65, 70, 73	11	15
103	Textron 20, 22, 26, 27, 28, 30, 32, 33, 34, 35, 56, 37, 38, 39, 42, 73	14	2
104	Greyhound 20, 22, 28, 35, 37, 38, 39, 41, 42, 47, 50, 51, 56, 58, 59, 60, 67, 73, 89	7	12
128	Martin Marietta 24, 25, 28, 32, 33, 34, 36, 37, 14, 15, 50, 51, 73, 75	8	6
131	Dart Industries 20, 23, 24, 28, 30, 32, 33, 34, 35, 36, 38, 39, 42, 50, 51, 59, 73, 89	12	6
132	U.S. Industries 22, 23, 24, 25, 26, 27, 28, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 14, 17, 50, 51, 59, 61, 79	17	7
143	Northwest Industries 20, 22, 23, 25, 28, 30, 31, 32, 34, 35, 36, 10, 42, 50, 51, 54, 55, 59	11	7
173	Walter Kidde 24, 25, 27, 30, 31, 32, 33, 34, 36, 37, 38, 39, 14, 16, 17, 42, 50, 51, 59, 73, 79, 89	12	10
180	Ogden 20, 33, 34, 35, 37, 42, 44, 45, 47, 50, 51, 59, 79	5	8
188	Colt Industries 32, 33, 34, 35, 36, 37, 42, 50, 67	6	3

Table 3

Product Lines of the 200 Largest Manufacturing Firms in Japan in 1973

Japan, 1973	Major	Others
33, 20, Kirin Brewery	2082	2086
63, 20, Taiyo Fishery	209	n.a.
76, 20, Santory	2085	
86, 20, Ajinomoto	2099	2075, 2048
98, 20, Nichiro Gyogyo	2092	2091, 204
100, 20, Nippon Suisan	2092	2091, 44
101, 20, Snow Brand Milk	202	2079
111, 20, Sapporo Breweries	2082	2086
116, 20, Asahi Breweries	2082	2086
125, 20, Meiji Seika	2065	2052, 283, 203, 2066, 2099
135, 20, Morinaga Milk Ind.	202	
143, 20, Meiji Milk Product	202	
149, 20, Nisshin Flour Mill	204	47, 422
152, 20, Nippon Reizo	2092	2097, 514
162, 20, Morinaga	2065	2052, 203, 65
178, 20, Kikkoman Shoyu	2099	2085
190, 20, Nihon Nosan Kogyo	204	
192, 20, Nisshin Oil Mills	2075	287
201, 20, Nippon Oils & Fats	207	284
18, 28, Mitsubishi Chem. Ind.	286	282, 287, 333, 299
21, 28, Asahi Chemical Ind.	282	222, 286, 307, 283, 20, 32
22, 28, Toray Industries	282	222, 286, 307
23, 28, Sumitomo Chemical	286	282, 333, 281, 287, 283
29, 28, Showa Denko	286	333, 281, 2895
30, 28, Teijin	282	222
37, 28, Mitsui Toatsu Chem.	286	282, 307, 287, 281, 283
43, 28, Takeda Chemical Ind.	283	287, 281, 286, 20
48, 28, Mitsubishi Petrochem.	286	282
51, 28, Mitsubishi Rayon	282	222, 307, 228
66, 28, Kuraray	282	222, 307, 228
73, 28, Dainippon Ink Chem.	282	289, 284
74, 28, Mitsui Petrochemical	286	
85, 28, Sekisui Chemical	282	307
89, 28, Electro Chemical Inc.	281	287, 2869, 282
92, 28, Mitsubishi Gas Chem.	286	282, 307
103, 28, Shiseido	284	
105, 28, Toyo Soda Mfg.	282	327, 281
112, 28, Kanegafuchi Chem. Inc.	282	207, 222, 333, 286, 208, 283
119, 28, Sankyo	283	287, 20
121, 28, Kyowa Hakko Kogyo	286	2099, 283, 2085, 287
122, 28, Nissan Chem. Ind.		
133, 28, Shinetsu Chem. Inc.	282	307, 367, 286, 331, 281

Table 8 (continued)

Japan, 1973	Major	Others
146, 28, Chisso	286	287, 282, 281
147, 28, Shionogi	283	
148, 28, Daicel	282	307
150, 82, Nippon Soda	281	286
151, 28, Nippon Sanso	281	354, 286
156, 28, Tanabe Seiyaku	283	
161, 28, Kureha Chem. Ind.	282	307, 286, 281, 287
174, 28, Fujisawa Pharmaceut.	283	
183, 28, Kao Soap	284	n.a.
193, 28, Banyu Pharmaceutical	283	
195, 28, Toyo Ink Mfg.	289	282, 307
199, 28, Nippon Kayaku		
200, 28, Mitsubishi Plastics	282	307
19, 35, Komatsu	353	355, 356, 332
26, 35, Sumitomo Shipbldg.	353	373
32, 35, Kubota	351	344, 346, 332, 356
40, 35, Fujitsu	3573	366, 367
79, 35, Japan Steel Works	355	332, 331, 348
81, 35, Niigata Engineering	351	355, 356, 373, 353, 355, 374
94, 35, Koyo Seiko	3562	
118, 35, Nippon Seiko	3562	
124, 35, NTN Toyo Bearing	3562	
126, 35, Kaikin Kogyo	3585	3569, 355, 2819, 307
131, 35, Toyoda Auto Loom	3552	3714, 353
132, 35, Ebara Mfg.	358	
138, 35, Ricoh	357	2648, 3861
169, 35, Fujikoshi	3562	
184, 35, Toyo Umpanki	353	
196, 35, Kato Works	353	
202, 35, Riccar	3636	n.a.
205, 35, Janome Sewing Mach.	3636	n.a.
4, 36, Hitachi	361/2	363, 364, 365, 366, 358, 374
9, 36, Tokyo Shibaura Elec.	361/2	363, 364, 365, 366, 367
12, 36, Matsushita Elec. Ind.	366	363, 367, 364, 365, 3692, 361/2
13, 36, Mitsubishi Electric	361/2	366, 358, 363, 364, 365
20, 36, Nippon Electric	366	367
46, 36, Fuji Electric	361/2	358, 362, 363, 364, 365
49, 36, Sony	3651	3652, 366, 367
52, 36, Sanyo Electric	366	367, 363, 364, 365
72, 36, Sharp	3651	363, 364, 367
96, 36, Oki Electric Ind.	3661	construction

Table 3 (continued)

Japan, 1973	Major	Others
123, 36, Matsushita Electron.	367	
144, 36, Yasukawa Elec. Mfg.	361/2	
159, 36, Shinko Electric	361/2	356, 353, 361, 3728, 357
160, 36, Meidensha Elec. Mfg.	361/2	353, construction
187, 36, Omron Tateishi Elect.	3661	construction
2, 37, Mitsubishi Heavy Ind.	373	356, 344, 351, 358, 374, 353, 3721
5, 37, Ishikawajima Harima	373	3728, 355, 356, 353, 344
7, 37, Nissan Motor	3711	3713, 3714, 3552, 372
11, 37, Toyota Motor	3711	3713
14, 37, Kawasaki Heavy Ind.	373	353, 356, 358, 351, 372, 344, 374
16, 37, Hitachi Shipbldg.	373	344, 353, 356, 358, 332
17, 37, Toyo Kogyo	3711	3713, 3714, 3532, 354
24, 37, Mitsui Shipbldg. Eng.	373	355, 353, 351
34, 37, Isuzu Motor	3713	3711, 3714
35, 37, Honda Motor	375	3711, 3711
53, 37, Hino Motors	3713	3711, 3714
70, 37, Sasebo Heavy Ind.	373	344, 348, 35
78, 37, Fuji Heavy Industries	3711	3721, 374, 3713, 35
87, 37, Suzuki Motor	3711	375, 3714
88, 37, Hakodate Dock	373	construction
90, 37, Nippon Denso	3714	
110, 37, Daihatsu Kogyo	3711	3714
140, 37, Aishin Seiki	3714	
153, 37, Sanoyasu Dockyard	373	344, construction
167, 37, Nippon Sharyo Seizo	374	
75, 38, Fuji Photo Film		
155, 38, Shimazu Seisakusho		
177, 38, Konishiroku Photo		
191, 38, Nippon, Kogaku		
197, 38, Canon		
129, 39, Nippon Gakki		

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15

WHARTON REPROGRAPHICS

Nineteenth Century Retailing and the Rise of the Department Store

Early Forms: The Generalist and the Specialist

The classic retailing establishment in the first third or so of the nineteenth century, especially outside of all but the biggest cities, was the general store, and "general" indeed was the merchandise offered for sale. At one rural frontier store, for example, a customer might find tea, sugar, coffee, flour, and liquor among the edibles and "bibibles"; various spices; hardware and leather goods, axes, log chains, kettles, pots, pans, kegs of nails piled in spare spaces (of which there couldn't have been a great many, stores being as small as 400 square feet) or hanging on rafters by cords; and shoes, saddles and harnesses.[1]

Here is a description of the business day at one store in the Missouri Territory in 1818:

The Widow Wright

6	lbs of coffee	$3.00
2	handkerchiefs	1.00
1	comb	1.25
1	damaged sugar bowl	.25
¼	lb. Hyson tea	.75
1	shawl	2.50
6	yards of gingham	3.00
2	thimbles	.25

Ezekiel Murray

1 pair of trace chains	$2.50

Professor Richard S. Tedlow prepared this case as the basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation.

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1. Lewis E. Atherton, "The Pioneer Merchant in Mid-America," *The University of Missouri Studies*, vol. 14, no. 2 (April 1, 1939).

Customer C

4 lbs. coffee	$4.90
1 dozen buckles	.75
6 skeins of silk	.75
3 yards of plush	9.00
5½ yards of cloth	4.81
1 straw hat	3.00

Customer D

1 pair shoes	$1.50

Customer E

1 pair shoes	$2.00
2 skeins of silk	.25

Customer F

Ribbon	$ .50

Customer G

Ribbon	$ .33

Customer H

1 handkerchief	$ .25

Customer I

5 lb. nails	$ .28

Some noteworthy characteristics of early retailing include:

1. The pace of business was slow. The above description is not atypical of a 14-hour day at many stores.

2. Transactions were usually not in cash. Credit was granted, sometimes for as long as a year. A shortage of an acceptable circulating medium often led to money-barter, whereby goods would be exchanged for goods with money equivalents used as a standard of value.

3. Price was a matter of negotiation between storekeeper and customer.

4. Advertising was usually restricted to the announcement of what goods were available and from where they had been purchased. Prices were not mentioned. Sometimes copy would change no more often than annually.

5. The rule of business was *caveat emptor*. "The customers cheated us in their fabrics," recalled a Connecticut storekeeper of the 1820s; "we cheated the customers with our goods. Each party expected to be cheated, if it was possible."[2] Admittedly the man reminiscing is Phineas T. Barnum, but even allowing for possible overstatement it is not unfair to say that honesty was a rare commodity.

As the urban market developed, retail stores tended to specialize more strictly in the wares they carried. Specialization first developed through four general categories: groceries, dry goods, hardware, and home furnishings. But these general categories quickly broke down as well, so that the major city of 1850 had specialty stores dedicated to tools, boots and shoes, carpeting, china and glassware, cloaks and mantillas, combs and fancy goods, cutlery and hardware, fancy dry goods, feathers and mattresses, furniture, men's furnishings, hats, caps, and furs, hosiery and gloves, India rubber goods, laces and embroideries, millinery, saddles, trunks, and harnesses, silks and ribbons, tea and coffee, tobacco and snuff, upholstery, umbrellas and parasols, butter and cheese, and ready-to-wear clothing for men.

The specialist had a number of noteworthy operational advantages. First, as the industrial revolution progressed, the variety of goods available for sale greatly increased. Thus the maintenance of a "reasonably complete assortment" of, for example, ribbons meant more buying expertise and more working capital in 1860 than it did in 1800. Second, specialization meant greater influence with the supplier. Third, the increase in trading population brought about both by improvements in transportation and by immigration to the cities meant that the retailer did not have to rely on numerous different lines to generate enough business for an acceptable profit.

Not only were retailers specializing by class of trade, they were also specializing by business function. The distribution system had grown thick in the first half of the nineteenth century with intermediaries who financed transactions and physically distributed goods. Dry goods, for example, would pass from the importer (or, as the century progressed, the manufacturer), to the wholesaler, and then to the retailer. The great general merchants of the colonial era might handle all these functions (with the exception of manufacturing) themselves. So complete was this specialization in the seaboard cities of the East that a Philadelphia publication remarked in 1855 that "Division of trade into distinct branches appears to be in the natural order of things . . . The tendency, in all great commercial marts, is to simplification and in many cases only a single class of articles is kept by the merchant as in cotton goods, woolen goods, silk goods."[3]

As these words were being written, however, a movement was under way that would render them inaccurate.

2. Neil Harris, *Humbug* (Boston, 1973), p. 12.
3. Ralph M. Hower, *History of Macy's of New York* (Cambridge, Mass., 1943), pp. 83-84.

The Department Store

The idea of purchasing a wide variety of goods and services at the same place is not a new one. The fair in the Middle Ages, for example, was a collection of shops at one location. The department store is also a collection of shops at one location, the difference being that unlike the fair, these shops are under one management.

By 1860, a number of the great names in department store retailing had gotten their starts. These included Macy's, Wanamaker's, Gimbel's, Jordan Marsh, and Lord & Taylor. Marshall Field, which at the turn of the century is said to have been the largest wholesale and retail distributor in the United States, can be used to illustrate the problems and opportunities of the department store business from 1860 to 1900.[4]

Potter Palmer and Marshall Field

The story of Marshall Field begins with his predecessor and later partner, Potter Palmer. Palmer arrived in Chicago at the age of 26 with eight years' retail experience behind him and $5,000. The year was 1852, and there were about 35,000 people living in the city. Two decades previously Chicago was a mere unincorporated crossroads with a population of about a hundred. By 1890, it was one of the great cities in the world, with almost a million and a half inhabitants. There was no precedent in the world's history for such growth of a city.

In 1852, Chicago was still very much on the frontier. "It was only just beginning to emerge from the ooze of the shores of Lake Michigan. The railroad station at the foot of Lake Street . . . was an unroofed shed. The streets were always either deep in mud or sending up choking clouds of dust as horses and wagons rumbled by. Even the largest wagon often became stuck in the bottomless slime. . . . On warm days, garbage, dead rats, and animal excrement fermented together beneath the wooden sidewalks and made walking or shopping something less than a pleasure."[5]

Palmer set out not, as was the custom, to sell everything from codfish to calico. Rather, in his words, "I struck out for a large and distinctive dry goods store." As soon as volume permitted, he hired a full time buyer and sent him East. He specialized in goods of better quality and inaugurated a policy of allowing merchandise to be returned if it "prove[d] unsatisfactory either in price, quality, or style." His advertising was at first of the announcement variety, but he quickly turned to copy of greater variety with a stronger selling appeal.

By 1860, Palmer had moved the store to spacious quarters and had also inaugurated a wholesale business. His voracity for wholesale customers was as great as that for retail:

4. The following discussion is based on Robert W. Twyman, *History of Marshall Field & Co., 1852-1906* (Philadelphia, 1954).

5. Twyman, *Field*, p. 1.

> I always hunted for customers. If I learned of a man two hundred miles away in a clearing in the forest, who might buy, I got the name of my establishment to him and invited him in. After he once got acquainted with the store, we rarely lost him.[6]

His appeal at both wholesale and retail was price oriented. Low prices were made possible by the low cost position Palmer achieved through his New York buyer, through establishing direct relations with New England mills, and through making his own buying trips abroad.

Marshall Field arrived in Chicago from Pittsfield, Massachusetts at the age of 21 in 1855 "determined" as he put it, "not to remain poor." He got a job as a clerk at a retail store at a salary of $400 per year, of which he saved $200. He soon became a wholesale salesman in the hinterland, and despite his conservative manner and mien he proved quite a success. In fact, the great majority of Field's experience prior to going into business for himself was in wholesaling rather than the retail trade. He quickly rose to a partnership with his employer. Early in 1865, he and an associate named Levi Leiter formed another partnership, this one with Potter Palmer. The company was capitalized at $750,000, $250,000 of which was supplied by Field, $120,000 by Leiter, $330,000 by Palmer, and the remainder by Palmer's brother. Field concentrated on buying and for a time ran the firm's New York office himself. Leiter was the numbers person who kept a keen eye on accounts receivable and saw to it also that the firm paid its own bills on time.

In January 1867, Palmer withdrew from the firm, which then became Field, Leiter and Company. But its benefits from association with him continued to be great. First, Field and Leiter adopted Palmer's approach to the market. They guaranteed the quality of their goods and strove to make shopping pleasurable. Second, they continued the dual nature—retail and wholesale—of the company's trade. As **Exhibit 1A** illustrates, the wholesale business was in fact far greater than retail in sales and profits up to Field's death in 1906. (**Exhibit 1B** provides data on the annual purchases of the firm. **Exhibit 1C** gives a comparison of Field sales to business activity in Chicago.) Palmer's reputation and Field's own selling experience helped to solidify the hold of the firm on the trade of the rapidly growing Old Northwest (today's Middle West). Field never viewed himself as a innovator. "There were never any great ventures or risks," he once said, "nothing exciting whatever." He followed in Palmer's footsteps. Third, despite the fact that Palmer had withdrawn from the dry goods trade, he was still a force to be reckoned with in Chicago business.

The very year, for example, that Palmer left the Field firm, he decided to move the center of Chicago from Lake Street, the site of Field, Leiter and Company, to State Street. Lake Street was hemmed in at one end by the Chicago River and at the other by the railroad. State Street, on the other hand, presented unimpeded growth opportunities and, what is more, was where the city's southern and western transit lines met. It was not much more than an alley at the time, but Palmer was a man of vision. He secretly bought up run down properties and cleared a right of way 100 feet wide. He then put up the grand Palmer House Hotel and a six story marble-fronted "dry goods palace." He invited Field and Leiter to become his tenants for the healthy sum of $1,000 per week. They eagerly accepted the offer. Between 1869 and 1871 thirty marble front buildings arose on the new boulevard. Palmer had spent over $2 million, but, as he put it, "There was sense in doing things on a large scale if you could see a return."

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6. Twyman, *Field*, p. 7.

The opening of the new Field, Leiter building was an event attended by the "cream of the avenues" ushered in by blue-uniformed boys as spectators looked on. When the patrons entered, they found walnut counters, new gas fixtures, frescoed walls, and carpeting. In addition to the store's standard merchandise offering, exotic satins, silks, and sundry prestige pieces were put on sale especially for the occasion.

Only the first floor and that part of the basement not occupied by machinery were retailing selling space. The second floor was devoted to piece goods, the staple of the dry goods house. On the third floor were displayed woolen goods and bedding. The fourth floor was given over to "notions," more of which momentarily, and the fifth and sixth floors were for storage.

Field's facilities suffered two disastrous fires in the 1870s. The first was the cataclysmic Great Chicago Fire of October 8, 1871 which gutted a large part of the city. (See **Exhibit 2** for the assets of the firm at the time of the fire.) The firm lost $2.5 million in merchandise. Much of this was covered by insurance, but due to bankruptcies among some insurers, the firm wound up suffering a net loss of about three quarters of a million dollars. Field quickly reopened, but from that time forward the retail and wholesale businesses were housed in different structures for insurance purposes.

A second fire on November 14, 1877 gutted the retail building. The retail store had about $1 million in merchandise on hand at the time, four-fifths of which was lost. This time insurance had been taken out with firms in various cities, and the loss was covered. On April 9, 1879, the retail store finally occupied again its former location on State Street.

Merchandise

Like Palmer's store before it, Field, Leiter first specialized in dry goods. Indeed, Field and Leiter had declined to purchase Palmer's inventory of carpets. Soon, however, "notions" were added to the offering. This category appears to have been a catchall that included soap, umbrellas, ready-to-wear skirts, Parisian cloaks, and men's furnishings. The term "notions" covered a steadily increasing array of products through the 1870s and 1880s.

In 1872, the company reversed an earlier practice and began carrying carpets, rugs, and upholstery. It also started selling furs and a greatly expanded variety of men's furnishings. The offering in ladies' wear expanded in variety as well, as the ready-to-wear garment business grew. Four brands of corsets alone were carried. And a wide array of products for the home—mirrors, draperies, window shades, curtain fixtures, even sewing machine oil—were also added in the middle 1870s.

In the 1880s, in addition to those items already mentioned, the following products were carried: carpet sweepers, baby buggies, dining room tables, tricycles, copper rivets, atomizers, clocks, opera glasses, glue, sporting goods, mattresses, and more.

Under the management of Harry G. Selfridge, who ran the retail end of the business from 1884 to 1904 and then went on to found the large London department store bearing his name, Field finally became a full-line department store after the manner of Macy's in New York, and Wanamaker's in Philadelphia. There were fewer than fifty departments before Selfridge came and more than a hundred fifty at his departure. Selfridge was responsible for the Tea Room and

Bargain Basement as well as for shoes, toys, jewelry, and children's clothing departments, and he increased the store's commitment to furniture. Marshall Field himself sometimes objected to this proliferation. As late as 1889, he was still saying, "[W]e're in the dry goods business. Never forget that." But by the time of this declaration the store appeared to be pursuing a policy of selling everything it could at a profit and putting competing specialty stores out of business in the process.

Selfridge also developed the basement into a more effective tool for disposing of goods at a lower price which the full line retail departments had not been able to move at standard margins. Selfridge at first emphasized the basement's promotional nature, but his price appeal, it was feared, would reflect on the store as a whole. As a result, the appeal was modified to "Less Expensive But Reliable." At the turn of the century, the basement accounted for about a quarter of retail sales.

Buying

Field's strategy was to buy in cash, thus securing a one to two percent discount, and to buy in quantity. From the first, the store sought to eliminate the middleman. This meant going to New York, the wholesale capital of the nation, to New England for dry goods, and abroad for dry goods and specialty goods.

As the store developed, the position of the buyer became pivotal. Everyone, it was said, from the president to the sales clerk, worked for him. (Almost all buyers at this time were men, but this would change in the twentieth century.) The buyer selected only such goods purchased by the company's representatives in New York and Europe as he saw fit. He paid six to eight percent to the company for his open-to-buy, and he paid rent for that share of the physical plant he used. He priced and advertised as he wished. If he showed specified results, he would earn a bonus. Retail buying was a bit more complicated than wholesale because departments were more narrowly defined. Retail could buy from wholesale at six percent above the latter's cost.

The emphasis in buying was to maintain assortments and to rid the store of surplus stocks. The watchword was that "any surplus in Field's is not stock, it is cash." During the 1870s, Field began to emphasize this need to buy light and often and to keep stock turning. This, he felt, was more important than "volume of business," which "doesn't make any real difference." Data on stock turn are provided **in Exhibit 3.**

As the store grew, retail buyers began to operate more independently of the wholesale business. Retail buyers went abroad in increasing numbers, from two in 1875 to 21 in 1906, and like wholesale, retail was having many of its goods made up exclusively by manufacturers.

Indeed, the final step in cutting costs and achieving exclusivity was the development of manufacturing capacity. From the late 1860s the firm had been served by its own workshops. Not long after the turn of the century, a major commitment was made by the establishment of Fieldcrest Mills.

Selling

The selling job was, of course, very different in the wholesale and retail divisions. Marshall Field felt wholesale customers should make periodic trips to Chicago to view in person the store's goods and make their purchases. But as the company's trading area expanded from the Appalachians to the Pacific Coast and as eastern stores began sending traveling men to the hinterland in number, Field realized he had to respond. Field salesmen were divided along the company's product lines, and a single merchant might find himself contacted by a dozen of them in a month. The salesmen might spend as much as a year at a time away from the firm. Their major assets were their firm's merchandise and reputation and whatever personal charm they themselves might possess.

On the retail level, salaries were low, hours long, and supervision close. Nevertheless, morale is said to have been high, because the firm compared well on these dimensions with the competition. The emphasis was on courtesy rather than subservience to customers.

Constant efforts were made to create a pleasant shopping atmosphere. Pressure tactics were discouraged. Efforts were made to see to it that women shoppers were waited on by saleswomen, especially for their apparel needs. And delivery services were provided. The aim in both wholesale and retail was to take the risk out of the purchase. To this end, the firm held strictly to its returns policy. **Exhibit 4** shows the increases in retail and wholesale employment.

Advertising

As noted earlier, advertising began with the undifferentiated notice but evolved into a more selling-oriented appeal. Price was mentioned less often as time passed. Examples of Field advertising are provided in **Exhibit 6**. For comparative purposes, competitive advertising is reproduced in **Exhibit 7**.

Competition

Field was not, of course, the only department store in Chicago. But its dominance is shown by its impact compared to that of competitors (see **Exhibit 5**).

In addition to home grown competitors, eastern firms occasionally tried to enter the Chicago market. The greatest threat was posed by Alexander T. Stewart, the largest dry goods merchant in New York, who opened a Chicago branch in 1876. Stewart immediately slashed prices, and Field responded, meeting every cut.

Meetings were held with the new entrant to try to establish prices for staples. But these agreements kept collapsing as Stewart broke ranks. Remarked Field, "The fact will be ascertained by them after a while that at same prices, trade will give us the business . . . and then is when trouble will arise." By 1882, this threat ended as Stewart liquidated its business. When this company's founder died, the organization proved unable to endure.

Another serious threat was represented by the departure of Harry G. Selfridge. Selfridge was instrumental in building the retail side of the Field trade and was a man of undoubted ability. When the firm was incorporated in 1901, Selfridge was given 6,000 of the 60,000 shares issued at a par value of $100. (Field himself held 34,000 shares, while three other partners had 6,666-2/3 apiece.)

But Selfridge was anxious to strike out on his own. Fearful that his wholesale counterpart, John C. Shedd, would be chosen Field's successor, he purchased the firm of Schlesinger and Meyer. Selfridge soon found, however, that it was no fun competing against friends. He also learned what difficulties were involved in managing a department store lacking organizational strength and esprit. "There are a million things to do," he observed soon after taking his new position, "and nobody to do them." He soon sold out (at a profit) to Carson Pirie Scott and left for Britain.

Marshall Field: The Later Years

The Field, Lieter partnership was terminated in 1881, when Leiter was bought out. He sold his 295/725 interest in the firm for a reported $2,700,000. Field at this point admitted some loyal junior people into the partnership, keeping for himself a 46½ interest. His power at the firm was never questioned for the rest of his life.

In the 1880s, Field began to take an interest in other business activities. He started investing in real estate and indeed was the landlord for some competing stores, whose proximity to his own he welcomed. At his death, his real estate holdings were valued at $40 million. He invested in steel and railroads and joined a syndicate headed by John D. Rockefeller to purchase an iron range in Minnesota. For thirty years he sat on the board of the Merchants' Loan and Trust Company and through control of "his" bank he was a power in Chicago finance. He was also the largest holder of Pullman Sleeping Car's stock, which company was a major purchaser of bedding from his store. At his death on January 16, 1906, Field's estate was conservatively valued at just under $80 million.

Marshall Field's advice to young people seeking success was, "Be alert and ready to seize opportunities when they present themselves."

Exhibit 1A Net Sales of Marshall Field & Co. by Retail and Wholesale, 1865-1905

Year	Retail	Wholesale	Total
1865	-	-	$ 8,000,000[a]
1870	$ 2,000,000[a]	$11,000,000[a]	13,114,000
1875	3,139,000	15,438,000	18,577,000
1880	3,676,000	20,060,000	23,736,000
1885	4,553,000	20,454,000	25,007,000
1890	6,619,000	26,487,000	33,106,000
1895	7,622,000	24,769,000	32,391,000
1900	12,541,000	33,853,000	46,394,000
1905	24,478,000	42,792,000	67,270,000

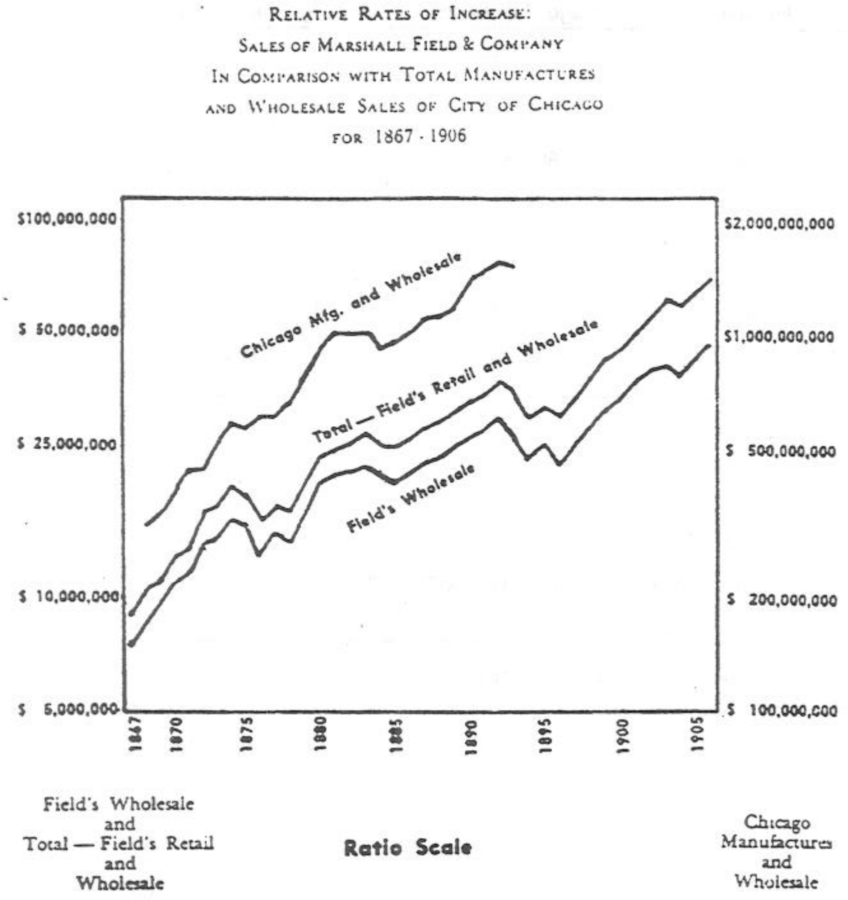
[a]Estimated

Net Profits of Marshall Field & Co. by Retail and Wholesale, 1865-1905

Year	Retail	Wholesale	Total
1865	-	-	$ 240,000
1870	-	-	-
1875	$ 68,000	$ 1,023,700	1,091,700
1880	384,300	1,441,500	1,825,800
1885	397,600	1,270,500	1,668,100
1890	740,000	1,276,000	2,016,000
1895	448,700	1,299,100	1,747,800
1900	998,300	1,496,500	2,494,800
1905	1,281,700	2,865,300	4,147,000

Source: Twyman, *Field*, pp. 175-177.

Exhibit 1B Relative Rates of Increase: Sales of Marshall Field & Company in Comparison with Total Manufactures and Wholesale Sales of City of Chicago for 1867-1906



Source: Twyman, *Field*, p. 170.

Exhibit 1C Annual Purchases of Marshall Field & Co., Wholesale, by Source for 1875-1905

Year	New York Purchases	Chicago Purchases	Foreign Purchases
1875	$13,334,948	$ 553,057	$1,523,035
1880	15,891,862	909,825	2,036,228
1885	17,147,947	896,585	2,025,647
1890	20,819,196	1,356,869	2,755,036
1895	20,740,241	1,335,491	3,604,236
1900	27,015,829	1,661,069	4,275,166
1905	40,955,765	3,533,841	5,317,864

Exhibit 2 Assets of Field, Leiter, and Company in 1871

Merchandise (mostly saved from fire or in transit to Chicago at time of fire)	$1,000,000
Money owed to firm	1,600,000
Cash	20,000
Real estate	30,000
Bonds	120,000
Horses, wagons and harness	15,000
Collectible insurance	1,780,000
Total assets	**$4,565,000**

Source: Twyman, *Field*, p. 42.

Exhibit 3 Average Stock-Turn of Marshall Field & Co., by Retail and Wholesale, 1880-1905

	Retail				Total	
Year	Dry Goods	Rugs and Carpets		Upholstery	Retail Average	Wholesale Average
1878	5.5	4.0		3.5	5.3	5.9
1879	5.3	3.2		3.3	5.3	5.4
1880	5.0	2.4		3.5	4.4	4.4
1881	5.2	3.3		4.0	5.1	5.2
1882	5.6	3.0		4.1	5.2	5.1
1883	5.7	3.3		3.6	5.1	5.0
1884	5.8	2.6		3.1	4.7	4.7
1885	5.9	2.6		3.4	4.6	4.5
1886	5.2	1.8	2.4	3.2	4.1	4.1
1887	4.8	2.0	2.7	3.2	4.5	4.5
1888	6.4	2.2	3.6	2.9	4.7	4.4
1889	6.3	2.1	3.1	2.9	4.8	4.6
1890	6.3	2.4	4.2	3.3	5.1	4.9
1891	5.7	3.2	2.0	4.3	4.8	4.8
1892	5.9	3.7	2.0	3.7	5.4	5.4
1893	5.6	3.9	1.7	3.7	4.4	4.3
1894	5.2	4.8	1.8	3.4	5.3	5.5
1895	5.8	3.7	2.2	3.7	4.9	4.8
1896	6.0	2.6	1.9	4.8	4.3	4.0
1897	6.2	3.2	1.8	4.6	4.8	4.1
1898	5.8	3.8	1.6	4.1	4.6	4.4
1899	5.5	5.2	1.9	4.4	4.8	4.5
1900	5.3	3.9	2.1	4.1	4.1	3.7
1901	5.7	4.8	2.3	4.5	4.8	4.6
1902	6.4	3.6	2.3	5.0	5.1	4.8
1903	7.2	4.1	2.6	5.4	5.0	4.4
1904	8.2	3.8	2.7	6.5	5.3	4.5
1905	7.5	4.5	2.8	6.9	5.4	4.8
1906	6.9	3.4	2.5	7.4	5.0	4.5

Source: Twyman, *Field*, p. 119.

Exhibit 4 Numbers of Employees of Marshall Field & Co., 1868-1906

Year	Retail	Wholesale	Total
1868	200	200	400
1872	-	-	1,000
1875	-	500	-
1877	800	-	-
1882	900	1,000	2,000
1884	1,500	-	-
1891	-	1,700	-
1894	3,000	1,800	-
1902	6,800	-	-
1906	6,500 to 9,000[a]	3,400 to 3,600[a]	12,000

Source: Twyman, *Field*, p. 69.

[a]These figures indicate the increase in employees during the Christmas season.

Exhibit 5 Value of Dry Goods Imported by Marshall Field & Co. and by Total of All Firms in City of Chicago, 1873-1880

Year	Marshall Field and Co.	All Chicago
1873	$1,212,439	$1,811,982
1874	1,297,711	1,780,915
1875	1,523,035	2,074,906
1876	1,099,471	1,834,778
1877	1,058,815	1,681,939
1878	1,081,549	1,410,285
1879	1,208,568	2,033,863
1880	2,036,228	2,935,412

Source: Twyman, *Field*, p. 28.

Exhibit 6 Advertising

European Modes.

MARSHALL FIELD &Co.

State & Washington-sts.,

Are in receipt of

"PARISIAN STYLES"

IN

"Costumes,"

"Mantles,"

AND

"Cloaks,"

And will continue to add daily the latest NOVELTIES as they appear in FOREIGN MARKETS.

The Fashions in these Garments are unusually attractive this season.

Ladies', Misses',

AND

Children's

Dresses and Cloaks

Are a special feature with us.

EXAMINATION INVITED.

Source: Twyman, *Field*, p. 145.

Exhibit 7

CHICAGO
ELECTRIFIED!

THE

MOST ATTRACTIVE GOODS

FOR

ONE DOLLAR

EVER OFFERED

IN THIS CITY.

TRUTH

STRANGER THAN FICTION.

I shall open To-Morrow, at the

City of Paris

ONE DOLLAR STORE

The largest display of fine spangled and feathered

SILK FANS

ever opened in Chicago, the choice for One Dollar. Among the lot are Ivory Fans costing $3 25 to import.

Fine Lisle Thread Hose,

for Ladies, at one-half the price charged in popular dry goods stores.

Real Oil Paintings, on canvas.

Chromos, and large 10x14 Mirrors, in gilt, rosewood, and walnut frames, for One Dollar, at

Stein's City of Paris

ONE DOLLAR STORE,

83 South Clark st.

Lined and Silk Parasols and Sun Umbrellas a la sombrero and a Stradella, for One Dollar, at Stein's.

Bronzed Work Boxes & Bronzed Hdkf. Boxes, something really elegant, for One Dollar.

The largest Glass Vases in the city, not waxed, but fast burned-in flowers. A Vase worth $3 for $1, at

STEIN'S,

83 CLARK STREET.

200 new patterns of articles of bijoutry, among which Bracelets, heretofore retailed at $10 a pair; something truly magnificent, for One Dollar. You come to see them and are conquered.

Last, though not least, Stein continues the sale of Coin Silver Tea-Spoons for One Dollar, at which price all the merchandise in the City of Paris is offered daily to a delighted public.

Having just completed an extensive addition to my Bazaar, I cordially invite these timid persons, whom the large crowds have often deterred from viewing and inspecting the thousand and one great bargains, which the City of Paris is so famous for, and which will be offered in a greater variety, and of a more substantial quality than ever before.

Source: Twyman, *Field*, p. 141.

UNIVERSITY OF PENNSYLVANIA

THE WHARTON SCHOOL

MANAGEMENT 101

Associate Professor Daniel Raff **Fall 1996**

Table of Contents: Bulkpack No. 2

1. How Competitive Forces Shape Strategy
2. Industry Attractiveness Worksheet
3. Industry Evolution
4. Sustainable Competitive Advantage
5. Canon, Inc.: Worldwide Copier Strategy
6. Coca Cola versus Pepsi [A]
7. Bitter Competition: The Holland Sweetener Company versus Nutrasweet
8. Power Play [A]: Nintendo in 8-But Video Games
9. The Conquest of Mexico: Excerpt from Book II, Chapter 8
10. American Airlines' Value Pricing [A]
11. Power Play [B]: Sega in 16-Bit Video Games
12. Competing on Resources: Strategy in the 90s
13. Wal-Mart Stores' Discount Operations
14. NEC
15. From Competitive Advantage to Corporate Strategy
16. General Electric in 1984
17. General Motors' Asian Alliances
18. Framework for Analyzing Organizations
19. Asea Brown Bovieri in 1987
20. Compaq Computer Corporation
21. Milestones for Successful Planning
22. Politics of New Venture Management
23. Styl France
24. Frontier Economies

2

WHARTON REPROGRAPHICS 1

How competitive forces shape strategy

Michael E. Porter

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March-April 1979

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How competitive forces shape strategy

Awareness of these forces can help a company stake out a position in its industry that is less vulnerable to attack

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Michael E. Porter

The nature and degree of competition in an industry hinge on five forces: the threat of new entrants, the bargaining power of customers, the bargaining power of suppliers, the threat of substitute products or services (where applicable), and the jockeying among current contestants.
To establish a strategic agenda for dealing with these contending currents and to grow despite them, a company must understand how they work in its industry and how they affect the company in its particular situation. The author details how these forces operate and suggests ways of adjusting to them, and, where possible, of taking advantage of them.

Mr. Porter is a specialist in industrial economics and business strategy. An associate professor of business administration at the Harvard Business School, he has created a course there entitled "Industry and Competitive Analysis." He sits on the boards of three companies and consults on strategy matters, and he has written many articles for economics journals and published two books. One of them, *Interbrand Choice, Strategy and Bilateral Market Power* (Harvard University Press, 1976) is an outgrowth of his doctoral thesis, for which he won the coveted Wells prize awarded by the Harvard economics department. He has recently completed two book manuscripts, one on competitive analysis in industry and the other (written with Michael Spence and Richard Caves) on competition in the open economy.

The essence of strategy formulation is coping with competition. Yet it is easy to view competition too narrowly and too pessimistically. While one sometimes hears executives complaining to the contrary, intense competition in an industry is neither coincidence nor bad luck.

Moreover, in the fight for market share, competition is not manifested only in the other players. Rather, competition in an industry is rooted in its underlying economics, and competitive forces exist that go well beyond the established combatants in a particular industry. Customers, suppliers, potential entrants, and substitute products are all competitors that may be more or less prominent or active depending on the industry.

The state of competition in an industry depends on five basic forces, which are diagrammed in the *Exhibit* on page 141. The collective strength of these forces determines the ultimate profit potential of an industry. It ranges from *intense* in industries like tires, metal cans, and steel, where no company earns spectacular returns on investment, to *mild* in industries like oil field services and equipment, soft drinks, and toiletries, where there is room for quite high returns.

In the economists' "perfectly competitive" industry, jockeying for position is unbridled and entry to the industry very easy. This kind of industry structure, of course, offers the worst prospect for long-run profitability. The weaker the forces collectively, however, the greater the opportunity for superior performance.

Whatever their collective strength, the corporate strategist's goal is to find a position in the industry where his or her company can best defend itself against these forces or can influence them in its favor. The collective strength of the forces may be

painfully apparent to all the antagonists; but to cope with them, the strategist must delve below the surface and analyze the sources of each. For example, what makes the industry vulnerable to entry? What determines the bargaining power of suppliers?

Knowledge of these underlying sources of competitive pressure provides the groundwork for a strategic agenda of action. They highlight the critical strengths and weaknesses of the company, animate the positioning of the company in its industry, clarify the areas where strategic changes may yield the greatest payoff, and highlight the places where industry trends promise to hold the greatest significance as either opportunities or threats. Understanding these sources also proves to be of help in considering areas for diversification.

Contending forces

The strongest competitive force or forces determine the profitability of an industry and so are of greatest importance in strategy formulation. For example, even a company with a strong position in an industry unthreatened by potential entrants will earn low returns if it faces a superior or a lower-cost substitute product—as the leading manufacturers of vacuum tubes and coffee percolators have learned to their sorrow. In such a situation, coping with the substitute product becomes the number one strategic priority.

Different forces take on prominence, of course, in shaping competition in each industry. In the ocean-going tanker industry the key force is probably the buyers (the major oil companies), while in tires it is powerful OEM buyers coupled with tough competitors. In the steel industry the key forces are foreign competitors and substitute materials.

Every industry has an underlying structure, or a set of fundamental economic and technical characteristics, that gives rise to these competitive forces. The strategist, wanting to position his company to cope best with its industry environment or to influence that environment in the company's favor, must learn what makes the environment tick.

This view of competition pertains equally to industries dealing in services and to those selling products. To avoid monotony in this article, I refer to both products and services as "products." The same general principles apply to all types of business.

A few characteristics are critical to the strength of each competitive force. I shall discuss them in this section.

Threat of entry

New entrants to an industry bring new capacity, the desire to gain market share, and often substantial resources. Companies diversifying through acquisition into the industry from other markets often leverage their resources to cause a shake-up, as Philip Morris did with Miller beer.

The seriousness of the threat of entry depends on the barriers present and on the reaction from existing competitors that the entrant can expect. If barriers to entry are high and a newcomer can expect sharp retaliation from the entrenched competitors, obviously he will not pose a serious threat of entering.

There are six major sources of barriers to entry:

1. *Economies of scale*—These economies deter entry by forcing the aspirant either to come in on a large scale or to accept a cost disadvantage. Scale economies in production, research, marketing, and service are probably the key barriers to entry in the mainframe computer industry, as Xerox and GE sadly discovered. Economies of scale can also act as hurdles in distribution, utilization of the sales force, financing, and nearly any other part of a business.

2. *Product differentiation*—Brand identification creates a barrier by forcing entrants to spend heavily to overcome customer loyalty. Advertising, customer service, being first in the industry, and product differences are among the factors fostering brand identification. It is perhaps the most important entry barrier in soft drinks, over-the-counter drugs, cosmetics, investment banking, and public accounting. To create high fences around their businesses, brewers couple brand identification with economies of scale in production, distribution, and marketing.

3. *Capital requirements*—The need to invest large financial resources in order to compete creates a barrier to entry, particularly if the capital is required for unrecoverable expenditures in up-front advertising or R&D. Capital is necessary not only for fixed facilities but also for customer credit, inventories, and absorbing start-up losses. While major corporations have the financial resources to invade almost any industry, the huge capital requirements in certain fields, such as computer manufacturing and mineral extraction, limit the pool of likely entrants.

4. *Cost disadvantages independent of size*—Entrenched companies may have cost advantages not available to potential rivals, no matter what their

The experience curve as an entry barrier

In recent years, the experience curve has become widely discussed as a key element of industry structure. According to this concept, unit costs in many manufacturing industries (some dogmatic adherents say in *all* manufacturing industries) as well as in some service industries decline with "experience," or a particular company's cumulative volume of production. (The experience curve, which encompasses many factors, is a broader concept than the better-known learning curve, which refers to the efficiency achieved over a period of time by workers through much repetition.)

The causes of the decline in unit costs are a combination of elements, including economies of scale, the learning curve for labor, and capital-labor substitution. The cost decline creates a barrier to entry because new competitors with no "experience" face higher costs than established ones, particularly the producer with the largest market share, and have difficulty catching up with the entrenched competitors.

Adherents of the experience curve concept stress the importance of achieving market leadership to maximize this barrier to entry, and they recommend aggressive action to achieve it, such as price cutting in anticipation of falling costs in order to build volume. For the combatant that cannot achieve a healthy market share, the prescription is usually, "Get out."

Is the experience curve an entry barrier on which strategies should be built? The answer is: not in every industry. In fact, in some industries, building a strategy on the experience curve can be potentially disastrous. That costs decline with experience in some industries is not news to corporate executives. The significance of the experience curve for strategy depends on what factors are causing the decline.

If costs are falling because a growing company can reap economies of scale through more efficient, automated facilities and vertical integration, then the cumulative volume of production is unimportant to its relative cost position. Here the lowest-cost producer is the one with the largest, most efficient facilities.

A new entrant may well be more efficient than the more experienced competitors; if it has built the newest plant, it will face no disadvantage in having to catch up. The strategic prescription, "You must have the largest, most efficient plant," is a lot different from, "You must produce the greatest cumulative output of the item to get your costs down."

Whether a drop in costs with cumulative (not absolute) volume erects an entry barrier also depends on the sources of the decline. If costs go down because of technical advances known generally in the industry or because of the development of improved equipment that can be copied or purchased from equipment suppliers, the experience curve is no entry barrier at all—in fact, new or less experienced competitors may actually enjoy a cost *advantage* over the leaders. Free of the legacy of heavy past investments, the newcomer or less experienced competitor can purchase or copy the newest and lowest-cost equipment and technology.

If, however, experience can be kept proprietary, the leaders will maintain a cost advantage. But new entrants may require less experience to reduce their costs than the leaders needed. All this suggests that the experience curve can be a shaky entry barrier on which to build a strategy.

While space does not permit a complete treatment here, I want to mention a few other crucial elements in determining the appropriateness of a strategy built on the entry barrier provided by the experience curve:

☐ The height of the barrier depends on how important costs are to competition compared with other areas like marketing, selling, and innovation.

☐ The barrier can be nullified by product or process innovations leading to a substantially new technology and thereby creating an entirely new experience curve.* New entrants can leapfrog the industry leaders and alight on the new experience curve, to which those leaders may be poorly positioned to jump.

☐ If more than one strong company is building its strategy on the experience curve, the consequences can be nearly fatal. By the time only one rival is left pursuing such a strategy, industry growth may have stopped and the prospects of reaping the spoils of victory long since evaporated.

*For an example drawn from the history of the automobile industry, see William J. Abernathy and Kenneth Wayne, "The Limits of the Learning Curve," HBR September-October 1974, p.109.

size and attainable economies of scale. These advantages can stem from the effects of the learning curve (and of its first cousin, the experience curve), proprietary technology, access to the best raw materials sources, assets purchased at preinflation prices, government subsidies, or favorable locations. Sometimes cost advantages are legally enforceable, as they are through patents. (For an analysis of the much-discussed experience curve as a barrier to entry, see the ruled insert above.)

5. *Access to distribution channels*—The new boy on the block must, of course, secure distribution of his product or service. A new food product, for example, must displace others from the supermarket shelf via price breaks, promotions, intense selling efforts, or some other means. The more limited the wholesale or retail channels are and the more that existing competitors have these tied up, obviously the tougher that entry into the industry will be. Sometimes this barrier is so high that, to surmount it, a new contestant must create its own distribution channels, as Timex did in the watch industry in the 1950s.

6. *Government policy*—The government can limit or even foreclose entry to industries with such controls as license requirements and limits on access to

raw materials. Regulated industries like trucking, liquor retailing, and freight forwarding are noticeable examples; more subtle government restrictions operate in fields like ski-area development and coal mining. The government also can play a major indirect role by affecting entry barriers through controls such as air and water pollution standards and safety regulations.

The potential rival's expectations about the reaction of existing competitors also will influence its decision on whether to enter. The company is likely to have second thoughts if incumbents have previously lashed out at new entrants or if:

☐ The incumbents possess substantial resources to fight back, including excess cash and unused borrowing power, productive capacity, or clout with distribution channels and customers.

☐ The incumbents seem likely to cut prices because of a desire to keep market shares or because of industrywide excess capacity.

☐ Industry growth is slow, affecting its ability to absorb the new arrival and probably causing the financial performance of all the parties involved to decline.

Changing conditions

From a strategic standpoint there are two important additional points to note about the threat of entry.

First, it changes, of course, as these conditions change. The expiration of Polaroid's basic patents on instant photography, for instance, greatly reduced its absolute cost entry barrier built by proprietary technology. It is not surprising that Kodak plunged into the market. Product differentiation in printing has all but disappeared. Conversely, in the auto industry economies of scale increased enormously with post-World War II automation and vertical integration—virtually stopping successful new entry.

Second, strategic decisions involving a large segment of an industry can have a major impact on the conditions determining the threat of entry. For example, the actions of many U.S. wine producers in the 1960s to step up product introductions, raise advertising levels, and expand distribution nationally surely strengthened the entry roadblocks by raising economies of scale and making access to distribution channels more difficult. Similarly, decisions by members of the recreational vehicle industry to vertically integrate in order to lower costs have greatly increased the economies of scale and raised the capital cost barriers.

Powerful suppliers & buyers

Suppliers can exert bargaining power on participants in an industry by raising prices or reducing the quality of purchased goods and services. Powerful suppliers can thereby squeeze profitability out of an industry unable to recover cost increases in its own prices. By raising their prices, soft drink concentrate producers have contributed to the erosion of profitability of bottling companies because the bottlers, facing intense competition from powdered mixes, fruit drinks, and other beverages, have limited freedom to raise *their* prices accordingly. Customers likewise can force down prices, demand higher quality or more service, and play competitors off against each other—all at the expense of industry profits.

The power of each important supplier or buyer group depends on a number of characteristics of its market situation and on the relative importance of its sales or purchases to the industry compared with its overall business.

A *supplier* group is powerful if:

☐ It is dominated by a few companies and is more concentrated than the industry it sells to.

☐ Its product is unique or at least differentiated, or if it has built up switching costs. Switching costs are fixed costs buyers face in changing suppliers. These arise because, among other things, a buyer's product specifications tie it to particular suppliers, it has invested heavily in specialized ancillary equipment or in learning how to operate a supplier's equipment (as in computer software), or its production lines are connected to the supplier's manufacturing facilities (as in some manufacture of beverage containers).

☐ It is not obliged to contend with other products for sale to the industry. For instance, the competition between the steel companies and the aluminum companies to sell to the can industry checks the power of each supplier.

☐ It poses a credible threat of integrating forward into the industry's business. This provides a check against the industry's ability to improve the terms on which it purchases.

☐ The industry is not an important customer of the supplier group. If the industry *is* an important customer, suppliers' fortunes will be closely tied to the industry, and they will want to protect the industry through reasonable pricing and assistance in activities like R&D and lobbying.

A *buyer* group is powerful if:

☐ It is concentrated or purchases in large volumes. Large-volume buyers are particularly potent

forces if heavy fixed costs characterize the industry —as they do in metal containers, corn refining, and bulk chemicals, for example—which raise the stakes to keep capacity filled.

□ The products it purchases from the industry are standard or undifferentiated. The buyers, sure that they can always find alternative suppliers, may play one company against another, as they do in aluminum extrusion.

□ The products it purchases from the industry form a component of its product and represent a significant fraction of its cost. The buyers are likely to shop for a favorable price and purchase selectively. Where the product sold by the industry in question is a small fraction of buyers' costs, buyers are usually much less price sensitive.

□ It earns low profits, which create great incentive to lower its purchasing costs. Highly profitable buyers, however, are generally less price sensitive (that is, of course, if the item does not represent a large fraction of their costs).

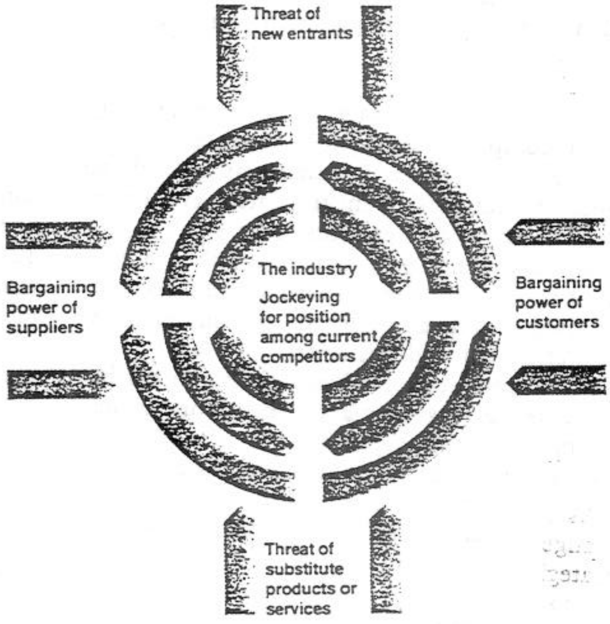
□ The industry's product is unimportant to the quality of the buyers' products or services. Where the quality of the buyers' products is very much affected by the industry's product, buyers are generally less price sensitive. Industries in which this situation obtains include oil field equipment, where a malfunction can lead to large losses, and enclosures for electronic medical and test instruments, where the quality of the enclosure can influence the user's impression about the quality of the equipment inside.

□ The industry's product does not save the buyer money. Where the industry's product or service can pay for itself many times over, the buyer is rarely price sensitive; rather, he is interested in quality. This is true in services like investment banking and public accounting, where errors in judgment can be costly and embarrassing, and in businesses like the logging of oil wells, where an accurate survey can save thousands of dollars in drilling costs.

□ The buyers pose a credible threat of integrating backward to make the industry's product. The Big Three auto producers and major buyers of cars have often used the threat of self-manufacture as a bargaining lever. But sometimes an industry engenders a threat to buyers that its members may integrate forward.

Most of these sources of buyer power can be attributed to consumers as a group as well as to industrial and commercial buyers; only a modification of the frame of reference is necessary. Consumers tend to be more price sensitive if they are purchasing products that are undifferentiated, expensive relative to their incomes, and of a sort where quality is not particularly important.

Exhibit
Forces governing competition in an industry



The buying power of retailers is determined by the same rules, with one important addition. Retailers can gain significant bargaining power over manufacturers when they can influence consumers' purchasing decisions, as they do in audio components, jewelry, appliances, sporting goods, and other goods.

Strategic action

A company's choice of suppliers to buy from or buyer groups to sell to should be viewed as a crucial strategic decision. A company can improve its strategic posture by finding suppliers or buyers who possess the least power to influence it adversely.

Most common is the situation of a company being able to choose whom it will sell to—in other words, buyer selection. Rarely do all the buyer groups a company sells to enjoy equal power. Even if a company sells to a single industry, segments usually exist within that industry that exercise less power (and that are therefore less price sensitive) than others. For example, the replacement market for most products is less price sensitive than the overall market.

As a rule, a company can sell to powerful buyers and still come away with above-average profitability only if it is a low-cost producer in its industry or if its product enjoys some unusual, if not unique, features. In supplying large customers with electric motors, Emerson Electric earns high returns because its low cost position permits the company to meet or undercut competitors' prices.

If the company lacks a low cost position or a unique product, selling to everyone is self-defeating because the more sales it achieves, the more vulnerable it becomes. The company may have to muster the courage to turn away business and sell only to less potent customers.

Buyer selection has been a key to the success of National Can and Crown Cork & Seal. They focus on the segments of the can industry where they can create product differentiation, minimize the threat of backward integration, and otherwise mitigate the awesome power of their customers. Of course, some industries do not enjoy the luxury of selecting "good" buyers.

As the factors creating supplier and buyer power change with time or as a result of a company's strategic decisions, naturally the power of these groups rises or declines. In the ready-to-wear clothing industry, as the buyers (department stores and clothing stores) have become more concentrated and control has passed to large chains, the industry has come under increasing pressure and suffered falling margins. The industry has been unable to differentiate its product or engender switching costs that lock in its buyers enough to neutralize these trends.

Substitute products

By placing a ceiling on prices it can charge, substitute products or services limit the potential of an industry. Unless it can upgrade the quality of the product or differentiate it somehow (as via marketing), the industry will suffer in earnings and possibly in growth.

Manifestly, the more attractive the price-performance trade-off offered by substitute products, the firmer the lid placed on the industry's profit potential. Sugar producers confronted with the large-scale commercialization of high-fructose corn syrup, a sugar substitute, are learning this lesson today.

Substitutes not only limit profits in normal times; they also reduce the bonanza an industry can reap in boom times. In 1978 the producers of fiberglass insulation enjoyed unprecedented demand as a result of high energy costs and severe winter weather. But the industry's ability to raise prices was tempered by the plethora of insulation substitutes, including cellulose, rock wool, and styrofoam. These substitutes are bound to become an even stronger force once the current round of plant additions by fiberglass insulation producers has boosted capacity enough to meet demand (and then some).

Substitute products that deserve the most attention strategically are those that (a) are subject to trends improving their price-performance trade-off with the industry's product, or (b) are produced by industries earning high profits. Substitutes often come rapidly into play if some development increases competition in their industries and causes price reduction or performance improvement.

Jockeying for position

Rivalry among existing competitors takes the familiar form of jockeying for position—using tactics like price competition, product introduction, and advertising slugfests. Intense rivalry is related to the presence of a number of factors:

☐ Competitors are numerous or are roughly equal in size and power. In many U.S. industries in recent years foreign contenders, of course, have become part of the competitive picture.

☐ Industry growth is slow, precipitating fights for market share that involve expansion-minded members.

☐ The product or service lacks differentiation or switching costs, which lock in buyers and protect one combatant from raids on its customers by another.

☐ Fixed costs are high or the product is perishable, creating strong temptation to cut prices. Many basic materials businesses, like paper and aluminum, suffer from this problem when demand slackens.

☐ Capacity is normally augmented in large increments. Such additions, as in the chlorine and vinyl chloride businesses, disrupt the industry's supply-demand balance and often lead to periods of overcapacity and price cutting.

☐ Exit barriers are high. Exit barriers, like very specialized assets or management's loyalty to a particular business, keep companies competing even though they may be earning low or even negative returns on investment. Excess capacity remains functioning, and the profitability of the healthy competitors suffers as the sick ones hang on.[1] If the entire industry suffers from overcapacity, it may

1. For a more complete discussion of exit barriers and their implications for strategy, see my article, "Please Note Location of Nearest Exit," *California Management Review*, Winter 1976, p. 21.

seek government help—particularly if foreign competition is present.

☐ The rivals are diverse in strategies, origins, and "personalities." They have different ideas about how to compete and continually run head-on into each other in the process.

As an industry matures, its growth rate changes, resulting in declining profits and (often) a shakeout. In the booming recreational vehicle industry of the early 1970s, nearly every producer did well; but slow growth since then has eliminated the high returns, except for the strongest members, not to mention many of the weaker companies. The same profit story has been played out in industry after industry —snowmobiles, aerosol packaging, and sports equipment are just a few examples.

An acquisition can introduce a very different personality to an industry, as has been the case with Black & Decker's takeover of McCullough, the producer of chain saws. Technological innovation can boost the level of fixed costs in the production process, as it did in the shift from batch to continuous-line photo finishing in the 1960s.

While a company must live with many of these factors—because they are built into industry economics—it may have some latitude for improving matters through strategic shifts. For example, it may try to raise buyers' switching costs or increase product differentiation. A focus on selling efforts in the fastest-growing segments of the industry or on market areas with the lowest fixed costs can reduce the impact of industry rivalry. If it is feasible, a company can try to avoid confrontation with competitors having high exit barriers and can thus sidestep involvement in bitter price cutting.

Formulation of strategy

Once the corporate strategist has assessed the forces affecting competition in his industry and their underlying causes, he can identify his company's strengths and weaknesses. The crucial strengths and weaknesses from a strategic standpoint are the company's posture vis-à-vis the underlying causes of each force. Where does it stand against substitutes? Against the sources of entry barriers?

Then the strategist can devise a plan of action that may include (1) positioning the company so that its capabilities provide the best defense against the competitive force; and/or (2) influencing the balance of the forces through strategic moves, thereby improving the company's position; and/or (3) anticipating shifts in the factors underlying the forces and responding to them, with the hope of exploiting change by choosing a strategy appropriate for the new competitive balance before opponents recognize it. I shall consider each strategic approach in turn.

Positioning the company

The first approach takes the structure of the industry as given and matches the company's strengths and weaknesses to it. Strategy can be viewed as building defenses against the competitive forces or as finding positions in the industry where the forces are weakest.

Knowledge of the company's capabilities and of the causes of the competitive forces will highlight the areas where the company should confront competition and where avoid it. If the company is a low-cost producer, it may choose to confront powerful buyers while it takes care to sell them only products not vulnerable to competition from substitutes.

The success of Dr Pepper in the soft drink industry illustrates the coupling of realistic knowledge of corporate strengths with sound industry analysis to yield a superior strategy. Coca-Cola and Pepsi-Cola dominate Dr Pepper's industry, where many small concentrate producers compete for a piece of the action. Dr Pepper chose a strategy of avoiding the largest-selling drink segment, maintaining a narrow flavor line, forgoing the development of a captive bottler network, and marketing heavily. The company positioned itself so as to be least vulnerable to its competitive forces while it exploited its small size.

In the $11.5 billion soft drink industry, barriers to entry in the form of brand identification, large-scale marketing, and access to a bottler network are enormous. Rather than accept the formidable costs and scale economies in having its own bottler network—that is, following the lead of the Big Two and of Seven-Up—Dr Pepper took advantage of the different flavor of its drink to "piggyback" on Coke and Pepsi bottlers who wanted a full line to sell to customers. Dr Pepper coped with the power of these buyers through extraordinary service and other efforts to distinguish its treatment of them from that of Coke and Pepsi.

Many small companies in the soft drink business offer cola drinks that thrust them into head-to-head competition against the majors. Dr Pepper, however,

maximized product differentiation by maintaining a narrow line of beverages built around an unusual flavor.

Finally, Dr Pepper met Coke and Pepsi with an advertising onslaught emphasizing the alleged uniqueness of its single flavor. This campaign built strong brand identification and great customer loyalty. Helping its efforts was the fact that Dr Pepper's formula involved lower raw materials cost, which gave the company an absolute cost advantage over its major competitors.

There are no economies of scale in soft drink concentrate production, so Dr Pepper could prosper despite its small share of the business (6%). Thus Dr Pepper confronted competition in marketing but avoided it in product line and in distribution. This artful positioning combined with good implementation has led to an enviable record in earnings and in the stock market.

Influencing the balance

When dealing with the forces that drive industry competition, a company can devise a strategy that takes the offensive. This posture is designed to do more than merely cope with the forces themselves; it is meant to alter their causes.

Innovations in marketing can raise brand identification or otherwise differentiate the product. Capital investments in large-scale facilities or vertical integration affect entry barriers. The balance of forces is partly a result of external factors and partly in the company's control.

Exploiting industry change

Industry evolution is important strategically because evolution, of course, brings with it changes in the sources of competition I have identified. In the familiar product life-cycle pattern, for example, growth rates change, product differentiation is said to decline as the business becomes more mature, and the companies tend to integrate vertically.

These trends are not so important in themselves; what is critical is whether they affect the sources of competition. Consider vertical integration. In the maturing minicomputer industry, extensive vertical integration, both in manufacturing and in software development, is taking place. This very significant trend is greatly raising economies of scale as well as the amount of capital necessary to compete in the industry. This in turn is raising barriers to entry and may drive some smaller competitors out of the industry once growth levels off.

Obviously, the trends carrying the highest priority from a strategic standpoint are those that affect the most important sources of competition in the industry and those that elevate new causes to the forefront. In contract aerosol packaging, for example, the trend toward less product differentiation is now dominant. It has increased buyers' power, lowered the barriers to entry, and intensified competition.

The framework for analyzing competition that I have described can also be used to predict the eventual profitability of an industry. In long-range planning the task is to examine each competitive force, forecast the magnitude of each underlying cause, and then construct a composite picture of the likely profit potential of the industry.

The outcome of such an exercise may differ a great deal from the existing industry structure. Today, for example, the solar heating business is populated by dozens and perhaps hundreds of companies, none with a major market position. Entry is easy, and competitors are battling to establish solar heating as a superior substitute for conventional methods.

The potential of this industry will depend largely on the shape of future barriers to entry, the improvement of the industry's position relative to substitutes, the ultimate intensity of competition, and the power captured by buyers and suppliers. These characteristics will in turn be influenced by such factors as the establishment of brand identities, significant economies of scale or experience curves in equipment manufacture wrought by technological change, the ultimate capital costs to compete, and the extent of overhead in production facilities.

The framework for analyzing industry competition has direct benefits in setting diversification strategy. It provides a road map for answering the extremely difficult question inherent in diversification decisions: "What is the potential of this business?" Combining the framework with judgment in its application, a company may be able to spot an industry with a good future before this good future is reflected in the prices of acquisition candidates.

2. Theodore Levitt, "Marketing Myopia," reprinted as an HBR Classic, September–October 1975, p. 26.

Multifaceted rivalry

Corporate managers have directed a great deal of attention to defining their businesses as a crucial step in strategy formulation. Theodore Levitt, in his classic 1960 article in HBR, argued strongly for avoiding the myopia of narrow, product-oriented industry definition.[2] Numerous other authorities have also stressed the need to look beyond product to function in defining a business, beyond national boundaries to potential international competition, and beyond the ranks of one's competitors today to those that may become competitors tomorrow. As a result of these urgings, the proper definition of a company's industry or industries has become an endlessly debated subject.

One motive behind this debate is the desire to exploit new markets. Another, perhaps more important motive is the fear of overlooking latent sources of competition that someday may threaten the industry. Many managers concentrate so single-mindedly on their direct antagonists in the fight for market share that they fail to realize that they are also competing with their customers and their suppliers for bargaining power. Meanwhile, they also neglect to keep a wary eye out for new entrants to the contest or fail to recognize the subtle threat of substitute products.

The key to growth—even survival—is to stake out a position that is less vulnerable to attack from head-to-head opponents, whether established or new, and less vulnerable to erosion from the direction of buyers, suppliers, and substitute goods. Establishing such a position can take many forms—solidifying relationships with favorable customers, differentiating the product either substantively or psychologically through marketing, integrating forward or backward, establishing technological leadership. ▽

2

WHARTON REPROGRAPHICS

Industry Attractiveness Worksheet

From EMHART Strategic Planning Work Guide, 1981

The next several pages will describe each of the six factors which together make up industry attractiveness. For each factor, the description is followed by a series of statements which illustrate some of the ways this factor could influence industry attractiveness.

After considering whether a statement is accurate for your industry, one of three columns should be used to mark whether you agree, are not sure or disagree with each statement. These check marks may then be totalled and used as one piece of information to help decide on the overall impact of a particular factor on industry attractiveness.

The word "industry" has already been used a number of times in this section, and it may be useful to give a rough definition of the term: by "industry" we mean competitors who make and sell products that are very close substitutes for each other. We recognize that this is an ambiguous definition.

As a practical rule, you may need to shift the way you define your industry to properly consider the effect of the six forces. It may be appropriate to use a broad definition of the industry when considering substitute products and the threat of entry into your industry, and to use a fairly specific definition when considering supplier and customer pressure or government action.

SUPPLIER PRESSURE Q & A

The strength of a business in relation to its suppliers indicates how much influence the business has over its materials or components costs and availability. The following illustration of supplier pressure adopts the viewpoint of the U.S. appliance industry. It illustrates the way they look at their suppliers:

- There are more suppliers to the appliance industry than there are appliance manufacturers; this means appliance manufacturers are free to pick and choose among suppliers.
- Appliance firms are capable of backward integration into supplier businesses. This gives them:
  - Knowledge of industry economics and pricing. • Great bargaining power. • The ability to choose between making or buying.

  But appliance suppliers serving more than one appliance manufacturer may be able to generate greater economies of scale and efficiency than are available to individual appliance manufacturers. This is the case if they have a production volume greater than the volume available to any one appliance manufacturer.
- Appliance firms are experiencing continued profit erosion, suggesting that they may be placing increased emphasis on cost reduction. Reducing suppliers' prices then becomes a very attractive option.

So on the whole, suppliers to the appliance industry do not have significant control over their customers.

Some tests of supplier pressure in your industry are given on the following page: one way to think about this factor is to consider negotiations between you and your suppliers. Who has the most bargaining power?

WORKSHEET — SUPPLIER PRESSURE Q & A

Consider the following statements about your industry. Mark the appropriate box indicating whether you agree, are not sure or disagree with each statement.

Statement	Agree	Not Sure	Dis-Agree
1. The industries from which you purchase are more concentrated than your industry; they consist of fewer companies than your own industry.			
2. You would risk losses (called "switching costs") if you were to switch from one supplier to another.			
3. There are few close substitutes for the raw materials your industry uses.			
4. Your suppliers could choose to integrate forward into your industry.			
5. Your industry is a marginal and an unimportant customer for your suppliers.			
6. Your industry purchases in low volume relative to the volumes your suppliers normally expect.			
7. Your industry's suppliers have a low level of fixed costs.			
8. Your suppliers' products save your industry money, or are important to the quality of your industry's products.			
9. It would not be practical for your industry to integrate backwards into your suppliers' industry.			
10. You buy a relatively large percentage of your materials and components (80% or more) from a relatively small percentage of your suppliers (20% or less).			
11. You are required to devote R&D resources to projects that would ordinarily be the responsibility of your suppliers.			
Total			

Summary: If you agree with most of these statements, your industry probably has high pressure from suppliers. Please mark your overall conclusion:

Supplier pressure in your industry is ______**high** ______**medium** ______**low.**

Over the past few years, this pressure has ______**increased** ______**stayed constant** ______**decreased.**

Over the next few years this pressure will ______**increase** ______**stay constant** ______**decrease.**

II. CUSTOMER PRESSURE

The strength of a business in relation to its customers indicates how much influence the business has when it comes to passing on price increases or negotiating changed conditions of sale with customers. The following illustration is from the perspective of the auto supply industry:

Experience tells us that having the U.S. automotive industry as a customer is always a pressure-filled situation—our criteria for assessing industry attractiveness, from the perspective of customer pressure, tell us:

1. The auto industry is highly concentrated, although it is becoming less so because of foreign competitors.
2. Auto industry profitability is low and has been declining for a number of years.
3. The auto industry will require large amounts of capital over the next few years to remain competitive with foreign manufacturers.
4. The auto industry is mature.
5. The auto industry can, has, and will continue to integrate backwards into many supplier industries, limited, of course, by capital constraints.
6. The auto industry buys in large volume.

From the perspective of the auto industry, any of the Big Three OEM manufacturers would be foolish, indeed, not to exert pressure on suppliers. These observations suggest the following guidelines in dealing with the auto industry:

1. Select products with applications in several industries. If a new product, avoid the temptation of developing auto-only applications.
2. Look for products which are relatively unimportant to the total cost of the automobile.
3. Select products which are relatively independent of model changes.
4. Look for situations where the auto OEM customer must invest heavily in the supplier's process and would incur a substantial economic loss to change suppliers or processes, or to integrate into the supplier's business.
5. Avoid products where the existence of several substitutes would give the auto OEM buyer a high degree of price leverage.
6. Avoid high fixed cost businesses where the supplier might be tempted to bid low for high volume.

Consider the following statements about your industry. Mark the appropriate box indicating whether you agree, are not sure or disagree with each statement.

	Agree	Not Sure	Dis-Agree
1. Your industry's customers are more concentrated than your industry is.			
2. Demand for your product is price-sensitive.			
3. Your customers could switch suppliers with no economic loss.			
4. Ready substitutes exist for your products.			
5. When your customers negotiate an order the total cost is significant to them.			
6. Your industry has a high level of fixed costs.			
7. Your customers are only slightly profitable.			
8. The quality of your industry's products is not an important consideration.			
9. Your industry's products do not save your customers money or time.			
10. Your industry could not realistically integrate forward into your customers' industry.			
11. Your industry's customers could realistically integrate backward into your industry.			
Total			

Summary: If you agree with most of these statements, your industry probably has high pressure from customers. Please mark your overall conclusion.

Customer pressure is ______**high** ______**medium** ______**low** in your industry.

Over the past few years. this pressure will ______**increase** ______**stay constant** ______**decrease.**

Over the next few years this pressure will ______**increase** ______**stay constant** ______**decrease.**

III. SUBSTITUTE PRODUCTS

If effective substitutes for your industry's products exist, this will place an immediate upper limit on the prices which may be charged by your industry.

You enjoy good protection from substitute products if you offer your customers good value, and if your value is increasing over time.

One way to determine what substitute products exist is to analyze the customer *function* your industry's products perform. Then examine what other products and technologies exist which more or less fulfill this same function.

This portion of industry attractiveness may be the most sensitive to rapid and unexpected technological advancement, as well as changes in tastes and preferences of consumers.

Examples of substitutes include margarine for butter, corn syrup for sugar in soft drinks; concrete, glass, steel and brick for each other in office buildings; and large scale integrated circuits for resistors and transistors. An example of a partial substitute, involving very different technology than the services it displaces, is the initial use of teleconferencing in business. Here television studios and tele-communications equipment are partial substitutes for business travel involving airlines and hotels. The function—business meetings—is identical.

WORKSHEET

SUBSTITUTE PRODUCTS Q & A

Consider the following statements about your industry. Mark the appropriate box indicating whether you agree, are not sure, or disagree with each statement.

	Agree	Not Sure	Dis-Agree
1. Close substitutes exist.			
2. Substitutes are substantially cheaper than your industry's products.			
3. Substitutes offer better value than your industry's products.			
4. Your industry's products perform a function which can be done using alternative technologies.			
5. Substitutes are in better supply than your industry's products.			
6. Substitutes offer performance improvements in certain applications.			
7. Technology is in a state of rapid evolution.			
8. Customer preferences are changing rapidly.			
Total			

Summary: If you agree with most of these statements, your industry probably has high pressure from substitute products. Please mark your overall conclusion.

Pressure from substitute products is ______**high** ______**medium** ______**low** in your industry.

Over the past few years this pressure has ______**increased** ______**stayed constant** ______**decreased.**

Over the next few years this pressure will ______**increase** ______**stay constant** ______**decrease.**

IV. GOVERNMENT ACTION

When government pressure is a factor in industry attractiveness, it is likely to be a very significant one.
This is the case when your industry is dependent on licenses, permits, or government standards, or when there are other government constraints which could become significant in international trade.
Government action affects business both directly and indirectly, and this is as true of government deregulation (airlines, trucking, natural gas) as it is of regulation.

WORKSHEET — GOVERNMENT ACTION Q & A

Consider the following statements about your industry. Mark the appropriate box indicating whether you agree, are not sure or disagree with each statement.

	Agree	Not Sure	Dis-Agree
1. Government licenses or permits are required to do business.			
2. Government limits access to raw materials.			
3. Government performance standards significantly limit manufacturing processes.			
4. Government performance standards significantly limit product characteristics.			
5. Potential instability creates great business uncertainty.			
6. Government policies restrict capital movements.			
7. Government policies limit dividend or royalty repatriation.			
8. Restrictive customs duties and practices disrupt imports or exports.			
9. Government policies restrict access to foreign exchange.			
10. Government policies place limits on foreign ownership.			
11. Competitors receive significant government assistance, which is not available to you.			
Total			

Summary: If you agree with most of these statements, your industry probably has high pressure from government action. Please mark your overall conclusion.

Pressure from government action is ______**high** ______**medium** ______**low** in your industry.

Over the past few years this pressure has ______**increased** ______**stayed constant** ______**decreased.**

Over the next few years this pressure will ______**increase** ______**stay constant** ______**decrease.**

V. THREAT OF NEW ENTRANTS

New entrants will be attracted to an industry if they see above average profits being made there, and if they think they, too, will be able to earn these above average profits.

Barriers to entry help to prevent easy entry into an industry, and if these barriers are significant, they will tend to protect the profitability of existing industry participants. If no entry barriers exist, competitors will find it relatively easy to enter the industry and fight it out with current participants.

The chief danger of new entrants is that they will cut their prices below current levels in order to gain market share, thus lowering industry prices and reducing profitability for all industry participants. This is particularly harmful when the industry is capital intensive and there is a great pressure to sell all available capacity at almost any price.

An example of an industry with relatively low barriers to entry is the photo finishing business in the United States: technology is fairly basic; all necessary raw materials are widely available, and it is possible to enter the business on a small scale with limited capital. Customers tend to be fairly price-sensitive, and a significant number will try out new photo finishers if they offer timely service at attractive prices.

It is partly in recognition of the industry's low barriers to entry that Kodak has switched their marketing emphasis from in-house photo finishing services to pushing the merits of using Kodak paper.

WORKSHEET — THREAT OF NEW ENTRANTS Q & A

Consider the following statements about your industry. Mark the appropriate box indicating whether you agree, are not sure or disagree with each statement.

	Agree	Not Sure	Dis-Agree
1. Your industry does not have significant economies of scale.			
2. Demand for your product is sensitive to changes in price.			
3. Customer loyalty is low—for a price break, many customers would switch suppliers.			
4. New entrants could take advantage of new technology for more efficient production.			
5. Your industry's products have no patent or proprietary protection.			
6. Your industry's products have no protection from governmental tariffs or permits.			
7. Capital requirements in your industry are low.			
8. Suppliers or customers could integrate into your industry, but your industry would not be able to retaliate by integrating into the new entrants' industry.			
9. Your industry has a high growth rate and/or good growth prospects for the future.			
10. Most participants in your industry are very profitable.			
11. A significant percentage of your industry's sales are through independent or non-captive distributors.			
12. New entrants would find it easier than present participants to meet price and delivery requirements.			
Total			

Summary: If you agree with most of these statements, your industry probably faces high pressure from new entrants. Please mark your overall conclusion:

The threat of entry is ______**high** ______**medium** ______**low** in your industry.

Over the past few years this pressure has ______**increased** ______**stayed constant** ______**decreased.**

Over the next few years this pressure will ______**increase** ______**stay constant** ______**decrease.**

VI. COMPETITIVE PRESSURE

Competitive pressure refers to the intensity of competition between the different competitors in an industry. In some industries the competition may be "cut-throat"; in others, it may be "gentlemanly".

To some extent, the amount of competitive pressure in an industry is determined by the extent to which the other components of industry attractiveness combine to create pressure on individual companies.

Great competitive pressure tends to make an industry unattractive, and to limit profitability. The absence of competitive pressure will tend to have the reverse effect.

Competitive pressure will tend to be intense in capital intensive cyclical industries: when demand is down, competitors will often price below full cost in order to make some contribution towards covering fixed overheads; competitors may also build up their capacity to handle all orders at peak demand times, leaving them with chronic over-capacity at all other times. This problem is magnified when capacity is added in large chunks because of scale economies, and when many competitors tend to bring new capacity on-line around the same period.

This pattern can be observed in both the aluminum industry and the cement industry.

WORKSHEET — COMPETITIVE PRESSURE Q & A

Consider the following statements about your industry. Mark the appropriate box indicating whether you agree, are not sure, or disagree with each statement.

	Agree	Not Sure	Dis-Agree
1. There are a large number of firms in your industry roughly equal in their abilities and competitive personalities.			
2. Industry growth is not sufficient to allow all firms to grow—there are fights for market share.			
3. Fixed costs form a large portion of total costs.			
4. The industry has excess capacity.			
5. Once in the industry, it is expensive for losing firms to exit from the industry.			
6. The industry is capital intensive.			
7. Demand for your products is price-sensitive.			
8. Competitors have very different motives for participating in the industry.			
9. Competitive information is widely available at low cost.			
10. Customers attempt to increase competitive pressure through their purchasing policies.			
Total			

Summary: If you agree with most of these statements, your industry probably has high competitive pressure. Please mark your overall conclusion:

Competitive pressure is ______**high** ______**medium** ______**low** in your industry.

Over the past few years this pressure has ______**increased** ______**stayed constant** ______**decreased.**

Over the next few years this pressure will ______**increase** ______**stay constant** ______**decrease.**

SUMMARY

Until now, this section has discussed the six forces individually and assumed that simply adding them up together could provide the necessary overall assessment of industry attractiveness. This is not always the case.

There are combinations of these factors which may make pressures either stronger or weaker. For example:

- High supplier pressure combined with low customer pressure may have no unfavorable effect on industry attractiveness, provided your industry can immediately pass along your suppliers' onerous conditions to your customers. The same is true if your business faces low supplier pressure but high customer pressure, if customers' requirements can be imposed on suppliers.
- High supplier pressure combined with high customer pressure gives you no place to go. Typically, this kind of industry pressure results in profitability that is almost invisible.
- If your industry is highly capital intensive, *and* your customers are very price-sensitive, you may be forced to sell capacity at below full cost at certain points over the economic cycle. The combination of both factors is often extremely unfavorable.
- If it is very easy for firms to enter an industry, and very hard for unsuccessful firms to exit from it, competitive pressure is likely to be intense, and profitability chronically depressed.

These examples are not at all exhaustive, but they should help make the point that the attractiveness of an industry may amount to either more—or less—than the sum of its pressures.

PRACTICAL EXERCISE #5

You have assessed the way each of these six forces affects the attractiveness of your industry. Now summarize this information. Please check the appropriate spaces on this form, copying from the individual sheets you filled in while working through this section of the guide:

SUMMARY OF INFLUENCE / INDUSTRY FORCE	THESE PRESSURES ARE NOW:			OVER THE PAST FEW YEARS THESE PRESSURES HAVE:			OVER THE NEXT FEW YEARS THESE PRESSURES ARE EXPECTED TO:		
	High	Medium	Low	Increased	Stayed Constant	Decreased	Increase	Stay Constant	Decrease
Supplier Pressure									
Customer Pressure									
Substitute Products									
Government Action									
Threat of Entry									
Competitive Pressure									

What are the major forces contributing to industry attractiveness:

1. ____________________
2. ____________________
3. ____________________

What are the major forces detracting from industry attractiveness:

1. ____________________
2. ____________________
3. ____________________

PRACTICAL EXERCISE #6

Please give an overall assessment of the attractiveness of your industry for your business, by marking one box in each of the three categories below. Use Practical Exercise #5 to decide on this summary.

Intense pressure from the six forces makes the industry unattractive; if pressure from the six forces is low, industry attractiveness is high.

	Industry Attractiveness is:			Over the Past Few Years Industry Attractiveness has:			Over the Next Few Years Industry Attractiveness will:		
	Low	Medium	High	Decreased	Stayed Constant	Increased	Decrease	Stay Constant	Increase
Overall Assessment									

Michael Porter
Competitive Strategy
Free Press, 1980

8
Industry Evolution

Structural analysis gives us a framework for understanding the competitive forces operating in an industry that are crucial to developing competitive strategy. It is clear, however, that industries' structures change, often in fundamental ways. Entry barriers and concentration have gone up significantly in the U.S. brewing industry, for example, and the threat of substitutes has risen to put a severe squeeze on acetylene producers.

Industry evolution takes on critical importance for formulation of strategy. It can increase or decrease the basic attractiveness of an industry as an investment opportunity, and it often requires the firm to make strategic adjustments. Understanding the process of industry evolution and being able to predict change are important because the cost of reacting strategically usually increases as the need for change becomes more obvious and the benefit from the best strategy is the highest for the first firm to select it. For example, in the early postwar farm equipment business, structural change elevated the importance of a strong exclusive dealer network backed by company support and credit. The firms that recognized this change first had their pick of dealers to choose from.

This chapter will present analytical tools for predicting the evolutionary process in an industry and understanding its significance for the formulation of competitive strategy. The chapter begins by describing some basic concepts in the analysis of industry evolution.

Next I will identify the driving forces that are at the root of industry change. Finally, some important economic relationships in the evolutionary process will be described and strategic implications explored.

Basic Concepts in Industry Evolution

The starting point for analyzing industry evolution is the framework of structural analysis in Chapter 1. Industry changes will carry strategic significance if they promise to affect the underlying sources of the five competitive forces; otherwise changes are important only in a tactical sense. The simplest approach to analyzing evolution is to ask the following question: Are there any changes occuring in the industry that will affect each element of structure? For example, do any of the industry trends imply an increase or decrease in mobility barriers? An increase or decrease in the relative power of buyers or suppliers? If this question is asked in a disciplined way for each competitive force and the economic causes underlying it, a profile of the significant issues in the evolution of an industry will result.

Although this industry-specific approach is the place to start, it may not be sufficient, because it is not always clear what industry changes are occurring currently, much less which changes might occur in the future. Given the importance of being able to predict evolution, it is desirable to have some analytical techniques which will aid in anticipating the pattern of industry changes that we might expect to occur.

PRODUCT LIFE CYCLE

The grandfather of concepts for predicting the probable course of industry evolution is the familiar product life cycle. The hypothesis is that an industry[1] passes through a number of phases or stages—introduction, growth, maturity, and decline—illustrated in Figure 8-1. These stages are defined by inflection points in the rate of growth of industry sales. Industry growth follows an S-shaped curve

[1]There is some controversy about whether the life cycle applies only to individual products or to whole industries. The view that it applies to industries is summarized here.

WHARTON REPROGRAPHICS W

because of the process of innovation and diffusion of a new product.[2] The flat introductory phase of industry growth reflects the difficulty of overcoming buyer inertia and stimulating trials of the new product. Rapid growth occurs as many buyers rush into the market once the product has proven itself successful. Penetration of the product's potential buyers is eventually reached, causing the rapid growth to stop and to level off to the underlying rate of growth of the relevant buyer group. Finally, growth will eventually taper off as new substitute products appear.

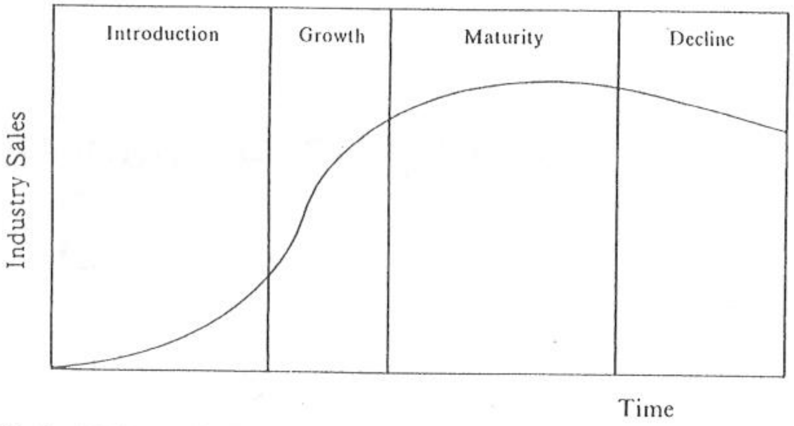
As the industry goes through its life cycle, the nature of competition will shift. I have summarized in Figure 8-2 the most common predictions about how an industry will change over the life cycle and how this should affect strategy.

The product life cycle has attracted some legitimate criticism:

1. The duration of the stages varies widely from industry to industry, and it is often not clear what stage of the life cycle an industry is in. This problem diminishes the usefulness of the concept as a planning tool.

2. Industry growth does not always go through the S-shaped pattern at all. Sometimes industries skip maturity, passing straight from growth to decline. Sometimes industry growth revitalizes after a period of decline, as has occurred in the motorcycle and bicycle industries and recently in the radio broadcasting industry. Some industries seem to skip the slow takeoff of the introductory phase altogether.

FIGURE 8-1. Stages of the Life Cycle



[2] Kotler (1972), pp. 432–433; see also Polli and Cook (1969), pp. 385–387.

FIGURE 8-2 Predictions of Product Life Cycle Theories About Strategy, Competition, and Performance

	Introduction	*Growth*	*Maturity*	*Decline*
Buyers and Buyer Behavior	High income purchaser[j,k,l] Buyer interia[a] Buyers must be convinced to try the product[a,j]	Widening buyer group[j] Consumer will accept uneven quality[l]	Mass market[l] Saturation[a] Repeat buying[a,j] Choosing among brands is the rule[a]	Customers are sophisticated buyers of the product[l]
Products and Product Change	Poor quality[l] Product design and development key[g] Many different product variations; no standards[k] Frequent design changes[j,k] Basic product designs[l]	Products have technical and performance differentiation[h] Reliability key for complex products[g] Competitive product improvements[j] Good quality[l]	Superior quality[l] Less product differentiation[b,f,i] Standardization[f,k] Less rapid product changes—more minor annual model changes[i,j] Trade-ins become significant[j]	Little product differentiation[h,i] Spotty product quality[l]
Marketing	Very high advertising/sales (a/s)[b,h] Creaming price strategy[k] High marketing costs[j]	High advertising,[b] but lower percent of sales than introductory[b,h] Most promotion of ethical drugs[c] Advertising and distribution key for nontechnical products[g]	Market segmentation[a,i,l] Efforts to extend life cycle[d,i] Broaden line[j] Service and deals more prevalent[a,j] Packaging important[a] Advertising competition[a] Lower a/s[a,b]	Low a/s and other marketing[b,j]

FIGURE 8-2 Continued

	Introduction	*Growth*	*Maturity*	*Decline*
Manufacturing and Distribution	Overcapacity[l] Short production runs[j,k] High skilled-labor content[k] High production costs[j] Specialized channels[i]	Undercapacity[l] Shift toward mass production[j,k] Scramble for distribution[j] Mass channels[l]	Some overcapacity[a] Optimum capacity[l] Increasing stability of manufacturing process[e] Lower labor skills[k] Long production runs with stable techniques[k] Distribution channels pare down their lines to improve their margins[j] High physical distribution costs due to broad lines[j] Mass channels[l]	Substantial overcapacity[a,l] Mass production[h] Specialty channels[l]
R&D	Changing production techniques[k]			
Foreign Trade	Some exports[k]	Significant exports[k] Few imports[k]	Falling exports[k] Significant imports[k]	No exports[k] Significant imports[k]
Overall Strategy	Best period to increase market share[e] R&D, engineering are key functions[i]	Practical to change price or quality image[i] Marketing the key function[i]	Bad time to increase market share[e] Particularly if low-share company[e] Having competitive costs becomes key[j] Bad time to change price image or quality image[i] "Marketing effectiveness" key[g]	Cost control key[g,i]

FIGURE 8-2 Continued

	Introduction	*Growth*	*Maturity*	*Decline*
Competition	Few companies[a,j,k,l]	Entry[a] Many competitors[a,d,j,l] Lots of mergers and casualties[l]	Price competition[a,i,j,k] Shakeout[j,k] Increase in private brands[d,e]	Exits[a] Fewer competitors[j,l]
Risk	High risk[a]	Risks can be taken here because growth covers them up[i]	Cyclicality sets in[j]	
Margins and Profits	High prices and margins[b,j,l] Low profits[g,i] Price elasticity to individual seller not as great as in maturity[k]	High profits[b,j,l] Highest profits[h] Fairly high prices[b] Lower prices than introductory phase[j] Recession resistant[j] High P/E's[j] Good acquisition climate[j]	Falling prices[b,i] Lower profits[l] Lower margins[b,i] Lower dealer margins[i,j] Increased stability of market shares and price structure[e] Poor acquisition climate—tough to sell companies[j] Lowest prices and margins[l]	Low prices and margins[a] Falling prices[b,j] Prices might rise in late decline[j,l]

[a]Levitt (1965).
[b]Buzzell (1966).
[c]Cox (1967).
[d]Buzzell et al. (1972).
[e]Catry and Chevalier (1974).
[f]Dean (1950).
[g]Clifford (1965).
[h]Forrester (1959).
[i]Patton (1959).
[j]Staudt, Taylor, and Bowersox (1976).
[k]Wells (1972).
[l]Smallwood (1973).

3. Companies can *affect* the shape of the growth curve through product innovation and repositioning, extending it in a variety of ways.[3] If a company takes the life cycle as given, it becomes an undesirable self-fulfilling prophesy..

4. The nature of competition associated with each stage of the life cycle is *different* for different industries. For example, some industries start out highly concentrated and stay that way. Others, like bank cash dispensers, are concentrated for a significant period and then become less so. Still others begin highly fragmented; of these some consolidate (automobiles) and some do not (electronic component distribution). The same divergent patterns apply to advertising, R&D expenditures, degree of price competition, and most other industry characteristics. Divergent patterns such as these call into serious question the strategic implications ascribed to the life cycle.

The real problem with the product life cycle as a predictor of industry evolution is that it attempts to describe *one* pattern of evolution that will invariably occur. And except for the industry growth rate, there is little or no underlying rationale for why the competitive changes associated with the life cycle will happen. Since actual industry evolution takes so many different paths, the life cycle pattern does not always hold, even if it is a common or even the most common pattern of evolution. Nothing in the concept allows us to predict when it will hold and when it will not.

A FRAMEWORK FOR FORECASTING EVOLUTION

Instead of attempting to describe industry evolution, it will prove more fruitful to look underneath the process to see what really drives it. Like any evolution, industries evolve because some forces are in motion that create incentives or pressures for change. These can be called *evolutionary processes*.

Every industry begins with an *initial structure*—the entry barriers, buyer and supplier power, and so on which exist when the industry comes into existence. This structure is usually (though not always) a far cry from the configuration the industry will take later in its development. The initial structure results from a combination of underlying economic and technical characteristics of the industry, the initial constraints of small industry size, and the skills and re-

[3]For a discussion of these methods, see Levitt (1965).

sources of the companies that are early entrants. For example, even an industry like automobiles with enormous possibilities for economies of scale started out with labor-intensive, job-shop production operations because of the small volumes of cars produced during the early years.

The evolutionary processes work to push the industry toward its *potential structure*, which is rarely known completely as an industry evolves. Imbedded in the underlying technology, product characteristics, and nature of present and potential buyers, however, there is a range of structures the industry might possibly achieve, depending on the direction and success of research and development, marketing innovations, and the like.

It is important to realize that instrumental in much industry evolution are the investment decisions by both existing firms in the industry and new entrants. In response to pressures or incentives created by the evolutionary process, firms invest to take advantage of possibilities for new marketing approaches, new manufacturing facilities, and the like, which shift entry barriers, alter relative power against suppliers and buyers, and so on. The luck, skills, resources, and orientation of firms in the industry can shape the evolutionary path the industry will actually take. Despite potential for structural change, an industry may not actually change because no firm happens to discover a feasible new marketing approach; or potential scale economies may go unrealized because no firm possesses the financial resources to construct a fully integrated facility or simply because no firm is inclined to think about costs. Because innovation, technological developments, and the identities (and resources) of the particular firms either in the industry or considering entry into it are so important to evolution, industry evolution will not only be hard to forecast with certainty but also an industry can potentially evolve in a variety of ways at a variety of different speeds, depending on the luck of the draw.

Evolutionary Processes

Although initial structure, structural potential, and particular firms' investment decisions will be industry-specific, we can generalize about what are the important evolutionary processes. There are

some predictable (and interacting) dynamic processes that occur in every industry in one form or another, though their speed and direction will differ from industry to industry:

- long-run changes in growth;
- changes in buyer segments served;
- buyers' learning;
- reduction of uncertainty;
- diffusion of proprietary knowledge;
- accumulation of experience;
- expansion (or contraction) in scale;
- changes in input and currency costs;
- product innovation;
- marketing innovation;
- process innovation;
- structural change in adjacent industries;
- government policy change;
- entries and exits.

Each evolutionary process will be described, with attention to its determinants, its relationship to other processes, and its strategic implications.

LONG-RUN CHANGES IN GROWTH

Perhaps the most ubiquitous force leading to structural change is a change in the long-run industry growth rate. Industry growth is a key variable in determining the intensity of rivalry in the industry, and it sets the pace of expansion required to maintain share, thereby influencing the supply and demand balance and the inducement the industry offers to new entrants.

There are five important external reasons why long-run industry growth changes:

Demographics

In *consumer goods*, demographic changes are one key determinant of the size of the buyer pool for a product and thereby the rate of growth in demand. The potential customer group for a product may be as broad as all households, but it usually consists of buyers characterized by particular age groups, income levels, educational levels, or geographic locations. As the total growth rate of the population, its distribution by age group and income level, and demographic factors change, these translate directly into alterations in demand. A particularly vivid current example of this situation is the adverse effect of the reduced U.S. birthrate on demand for baby products of all types, whereas products catering to the 25-to-35-year-old age group are currently enjoying the effects of the post-World War II baby boom. Demographics also represent a potential problem for the recording and candy industries, which have traditionally sold most heavily to the pre-20-year-old age group, which is currently shrinking.

Part of the effect of demographic changes is caused by *income elasticity*, which refers to the change in a buyer's demand for a product as his/her income rises. For some products (mink golf club covers), demand tends to rise disproportionately with buyers' income. For other products, demand rises less than proportionally as incomes rise, or even falls. It is important from a strategic point of view to identify where an industry's product lies in this spectrum, because it is critical to forecasting long-run growth as general income levels of buyers change both in a firm's home country and in potential international markets. Sometimes industries can shift their products up or down the scale of income elasticity through product innovation, however, so the effects of income elasticity are not necessarily a foregone conclusion.

For *industrial products*, the effect of demographic changes on demand is based on the life cycle of customer industries. Demographics affect consumers' demand for end products, which filters back to affect the industries supplying inputs toward those end products.

Firms can attempt to cope with adverse demographics by widening the buyer group for their product through product innovations, new marketing approaches, additional service offerings, and so on. These approaches can in turn affect industry structure by raising economies of scale, exposing the industry to fundamentally different buyer groups with different bargaining power, and so forth.

Trends in Needs

Demand for an industry's product is affected by changes in the lifestyle, tastes, philosophies, and social conditions of the buyer population which any society tends to experience over time. For example, in the late 1960s and early 1970s there were such shifts in the United States as a return to "nature," increased leisure time, more

casual dress, and nostalgia. These trends boosted demand for backpacks, blue jeans, and other products. The recent "back to basics" movement in education is creating new demand for standardized reading and writing tests, to give another example. There have also been social trends such as an increase in the crime rate, the changing role of women, and increased health consciousness that have increased demand for some products (bicycles, day care) and reduced demand for others.

Trends in needs like these not only directly affect demand but also affect the demand for industrial products indirectly through intervening industries. Trends in needs affect the demand in particular industry segments as well as total industry demand. Needs may be newly created or just made more intense by social trends. For example, property theft has increased quite dramatically in the last twenty years, greatly increasing the demand for security guards, locks, safes, and alarm systems. The rising expected losses due to theft have justified greater spending to prevent it.

Finally, changes in government regulation can increase or decrease needs for products. For example, demand for pinball and slot machines is growing as a result of impending and already passed legislation that legalizes gambling.[4]

Change in the Relative Position of Substitutes

Demand for a product is affected by the cost and quality, broadly defined, of substitute products. If the cost of a substitute falls in relative terms, or if its ability improves to satisfy the buyer's needs, industry growth will be adversely affected (and vice versa). Examples are the inroads that television and radio have made on the demand for live concerts by symphony orchestras and other performing groups; the growth in demand for magazine advertising space as television advertising rates climb sharply and prime advertising television time becomes increasingly scarce; and the depressing effect of rising prices on the demand of such products as chocolate candy and soft drinks relative to their substitutes.

In predicting long-run change in growth, a firm must identify all the substitute products that can meet the needs its product satisfies. Then technological and other trends that will affect the cost or quality of each of these substitutes should be charted. Comparing these with the analogous trends for the industry will yield predictions

[4]See *Dun's*, February 1977.

about future industry growth rates and identify critical ways in which substitutes are gaining, thereby providing leads for strategic action.[5]

Changes in the Position of Complementary Products

The effective cost and quality of many products to the buyer depends on the cost, quality, and availability of complementary products, or products used jointly with them. For example, in many areas of the United States mobile homes are primarily sited in mobile home parks. In the last decade there has been a chronic shortage of these parks, which has limited demand for mobile homes. Similarly, demand for stereophonic records was strongly affected by the availability of stereophonic audio equipment, which in turn was affected by the cost and reliability of this equipment.

Just as it is important to identify substitutes for an industry's product it is important to identify complements comprehensively. Complementary products should be viewed broadly. For example, credit at prevailing interest rates is a complementary product to purchases of durable goods. Specialized personnel are a complementary product to many technically oriented goods (e.g., computer programmers to computers and mining engineers to coal mining). Charting trends in cost, availability, and quality of complementary products will yield predictions about long-run growth for an industry's product.

Penetration of the Customer Group

Most very high industry growth rates are the result of increasing penetration, or sales to new customers rather than to repeat customers. Eventually, however, it is a fact of life that an industry must reach essentially complete penetration. Its growth rate is then determined by replacement demand. Renewed periods of adding new customers can sometimes be stimulated by product or marketing changes, which broaden the scope of the customer base or stimulate rapid replacement. However, all very high growth rates eventually come to an end.

Once penetration is reached the industry is selling primarily to repeat buyers. There may well be major differences betweeen selling to repeat and first-time buyers that have important consequences for

[5]Government policies can affect a product's position vis-à-vis substitutes in areas like safety regulation (that raises costs), subsidies, and so on.

30

industry structure. The key to achieving industry growth when selling to repeat buyers is either stimulating rapid replacement of the product or increasing per capita consumption. Since replacement is determined by physical, technological, or design obsolescence as perceived by the buyer, strategies to maintain growth after penetration will hinge on affecting these factors. For example, replacement demand for clothing is stimulated by annual and even seasonal style changes. And the classic story of General Motors' ascendency over Ford is an example of how model changes stimulated demand after market saturation for the basic (one color: black) automobile occurred.

Whereas penetration most often means that industry demand will level off, for *durable goods*, achieving penetration can lead to an abrupt drop in industry demand. After most potential customers have purchased the product, its durability implies that few will buy replacements for a number of years. If industry penetration has been rapid, this situation may translate into several very lean years for industry demand. For example, industry sales of snowmobiles, which underwent very rapid penetration, fell from 425,000 units per year in the peak year (1970-1971) to 125,000 to 200,000 units per year in 1976-1977.[6] Recreational vehicles underwent a similar though not quite so dramatic decline. The relation between the growth rate after penetration and growth before penetration will be a function of how fast penetration has been reached and the average time before replacement, and this figure can be calculated.

The decline in industry sales for durables means that manufacturing and distributing capacity will inherently overshoot demand. As a result, a serious decline in profit margins usually occurs, and some producers may exit. Another characteristic of the demand for durable goods is that growth fueled by penetration can overshadow cyclicality despite the fact that the product is inherently sensitive to the business cycle. An industry approaching penetration will thus have its first deep cycle, exacerbating the problem of overshooting.

Product Change

The five external causes of industry growth have presupposed no change in the products offered by the industry. Product innovation by the industry, however, can allow it to serve new needs, can improve the industry's position vis-à-vis substitutes, and can eliminate or reduce the necessity of scarce or costly complementary products. Thus product innovation can improve an industry's circumstances relative to the five external causes of growth, and thereby increase the industry's growth rate. Product innovations have played a major part in fueling the rapid growth of motorcycles, bicycles, and chain saws, for example.

[6] "A Smoother Trail for Snowmobile Makers," *Business Week*, December 13, 1976.

CHANGES IN BUYER SEGMENTS SERVED

The second important evolutionary process is change in the buyer segments served by the industry. For example, early electronic calculators were sold to scientists and engineers, only later to students and bill payers. Light aircraft were initially sold to the military and later to private and commercial users. Related to this is the possibility that additional segmentation of *existing* buyer segments can take place by creating different products (broadly defined) and marketing techniques for them. A final possibility is that certain buyer segments are no longer served.

The significance of new buyer segments for industry evolution is that the requirements for serving these new buyers (or eliminating requirements for serving obsolete segments) can have a fundamental impact on industry structure. For example, although early buyers of the product may not have required credit and field servicing, later buyers might. If the provision of credit and in-house service creates potential economies of scale and raises capital requirements, then entry barriers will rise significantly.

A good example is provided by changes occurring in the optical character reader business in the late 1970s. This industry and its leader, Recognition Equipment, have been producing large, expensive optical scanning machines to sort checks, credit cards, and mail. Each machine has been custom-made, requiring special engineering and produced on a job-shop basis. In recent years, however, small wands for use with retail point-of-sale terminals have been developed. In addition to opening up a vast potential market, the wands are amenable to high-volume, standardized manufacturing and will be purchased in large quantities by individual buyers. This development promises to change economies of scale, capital requirements, marketing methods, and many other aspects of industry structure.

Analysis of industry evolution, then, should include an identification of all potential new buyer segments and their characteristics.

LEARNING BY BUYERS

Through repeat purchasing, buyers accumulate knowledge about a product, its use, and the characteristics of competing brands. Products have a tendency to *become more like commodities* over time as buyers become more sophisticated and purchasing tends to be based on better information. Thus there is a natural force reducing product differentiation over time in an industry. Learning about the product may lead to increasing demands by buyers for warranty protection, service, improved performance characteristics, and so forth.

An example is the aerosol packaging industry. Aerosol packaging first came into use in consumer goods in the 1950s. The package, an extremely important part of marketing many consumer goods, often represents an important cost item to the marketing company. In the early years of aerosol packaging, consumer marketers were unfamiliar with how to design aerosol applications, how aerosol containers were filled, and how best to market aerosol products. A contract aerosol filling industry sprang up to assemble and fill aerosol packages, and this industry also played a major role in assisting consumer marketing companies find new aerosol applications, solve production problems, and so on. Over time, however, consumer marketers learned a great deal about aerosols and began developing their own applications and marketing programs, in some cases actually initiating integration backward. Contract fillers found it increasingly difficult to differentiate their services, and their role became increasingly one of supplying commodity aerosol containers. As a result, contract fillers' profit margins were severely squeezed, and many left the industry.

A buyer's learning tends to progress at different rates for different products, depending on how important the purchase is and the buyer's technical expertise. Smart or interested (because it is an important product) buyers tend to learn faster.

Offsetting buyer's experience is change in the product or in the way it is sold or used, such as new features, new additives (hexachlorophine), style changes, new advertising appeals, and the like. This development nullifies some of the buyer's accumulated knowl-

edge and hence enhances the possibilities for continued product differentiation. Such possibilities are also enhanced by expanding the customer base to new buyers inexperienced with the product, particularly those whose purchasing characteristics tend to make them learn slowly.

REDUCTION OF UNCERTAINTY

Another type of learning that affects industry structure is reduction of uncertainty. Most new industries are initially characterized by a great deal of uncertainty about such things as the potential size of the market, optimal product configuration, nature of potential buyers and how they can best be reached, and whether technological problems can be overcome. This uncertainty often leads firms to a high degree of experimentation, with many different strategies adopted representing different bets about the future. Rapid growth provides slack to allow these differing strategies to coexist for long periods of time.

Over time, however, there is a continual process by which uncertainties are resolved. Technologies are proven or disproven, buyers are identified, and indications are gleaned from the industry's growth about its potential size. Hand in hand with such reduction of uncertainty is a process of imitation of successful strategies and the abandonment of poor ones.

Reduction of uncertainty may also attract *new types of entrants* into the industry. Reduced risk may attract larger, established firms with lower-risk profiles than the newly created companies so common in emerging industries. As it becomes clear that an industry's potential is large and technological hurdles can be overcome, bigger firms may find it worth their while to enter—which has happened in recreational vehicles, video games, solar heating, and many other industries. Of course events can create new uncertainties in an industry, but like buyers' learning, reduction of uncertainty will be continually operating to resolve existing doubts.

Strategically, reduction of uncertainty and imitation suggest that a firm cannot rely on uncertainty alone to protect it from its rivals or from new entrants very long. Depending on mobility barriers, the imitation of successful strategies can be more or less difficult. To protect its position a firm must strategically prepare either to defend its position against imitators and new entrants or adjust its

approach if its early bets about the appropriate strategy prove wrong.

DIFFUSION OF PROPRIETARY KNOWLEDGE

Product and process technologies developed by particular firms (or suppliers or other parties) tend to become less proprietary. Over time, a technology becomes more established and knowledge about it more widespread. Diffusion occurs through a variety of mechanisms. First, firms can learn from physical inspection of competitors' proprietary products and from information gleaned from a variety of sources about the size, location, organization, and other characteristics of competitors' operations. Suppliers, distributors, and customers are all conduits for such information and often have strong interest in promoting diffusion for their own purposes (e.g., creating another strong supplier). Second, proprietary information is also diffused as it becomes embodied in capital goods produced by outside suppliers. Unless firms in the industry make their own capital goods or protect the information they give to suppliers, the technology may become purchasable by competitors. Third, personnel turnover increases the number of people who have the proprietary information and may provide a direct conduit for the information to other firms. Spin-off firms founded by technical personnel who have left pioneering companies are common, as is the practice of hiring away personnel. Finally, specialized personnel who are expert in the technology invariably become more numerous from sources such as consulting firms, suppliers, customers, response of university technical schools, and so on.

In the absence of patent protection, therefore, proprietary advantages will tend to erode, as hard as it is for some firms to accept this fact. Thus any mobility barriers built on proprietary knowledge or specialized technology tend to erode over time, as do those caused by shortages of qualified, specialized personnel. These changes make it easier not only for new competitors to spring up but also for suppliers or customers to vertically integrate into the industry.

Returning to the previously discussed aerosol example, over time the new aerosol technology became better and better known. Since the production volume needed to achieve efficient scale in aerosol packaging was relatively small, many large consumer marketing companies could support their own captive filling operations.

As knowledge about the technology and specialized personnel became more common, many of these companies vertically integrated into aerosol filling or could threaten to do so. This development left the contract filler in the role of meeting emergency demand and in a very adverse bargaining situation. The response of many contract fillers was to invest in improving filling technology and to invent new aerosol applications to restore their technological advantage. This strategy proved to be increasingly difficult, and the contract fillers' position weakened substantially over time.

The rate of diffusion of proprietary technology will depend on the particular industry. The more complex the technology, the more specialized the required technical personnel, the greater the critical mass of research personnel required, or the greater the economies of scale in the research function, the slower proprietary technology will tend to diffuse. When heavy capital requirements and economies of scale in R&D confront imitators, proprietary technology can provide a lasting mobility barrier.

One key offsetting force to diffusion of proprietary technology is patent protection, which legally inhibits diffusion. However, this protection is unreliable in preventing diffusion since patents can be sidestepped by similar inventions. The other offsetting force to diffusion is the continual creation of new proprietary technology through research and development. New knowledge will provide companies with additional periods of proprietary advantages. However, continual innovation may not pay if the diffusion period is short and buyers' loyalties to pioneering firms are not very strong.

Two of many possible patterns of mobility barriers arising from proprietary technology are illustrated in Figure 8-3. Economies of scale in research were initially low in both industries since the initial, crude, breakthrough innovations that created the product could be made by small groups of research personnel. This situation is relatively common, having occurred in such industries as minicomputers, semiconductors, and others. Proprietary technology provided a modest initial mobility barrier in such an industry, but one that was soon eroded by diffusion. In one industry, the complex technology led to increasing economies of scale in the research function. In the other, there was little opportunity for continued technological innovation and hence little need for further research on a significant scale. In the first industry, then, mobility barriers from proprietary technology quickly rose again to a level higher than the initial one. Eventually they tailed off as opportunities for further innovation

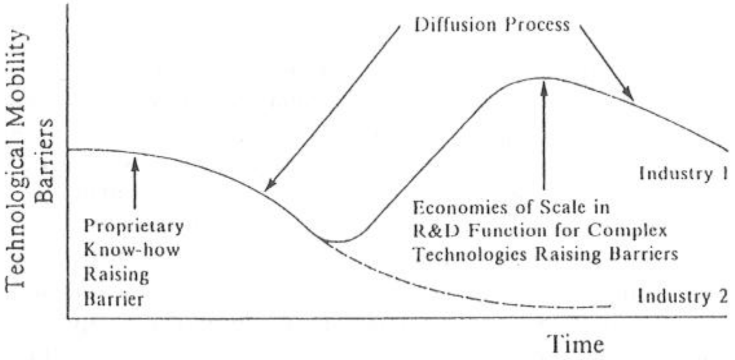


FIGURE 8-3. Illustrative Pattern of Technological Barriers and Industry Evolution

waned and diffusion took over. In the other industry, mobility barriers from proprietary technology quickly sunk to a low level. Thus one industry would probably have a profitable maturity phase, whereas the other would be dependent on other sources of barriers to prevent profit erosion to the competitive level. In the aerosol example, the nature of the technology did not allow the secondary increase in entry barriers.

From a strategic point of view, the diffusion of knowledge about technology means that to maintain position (1) existing know-how and specialized personnel must be protected, which is very difficult to do in practice;[7] (2) technological development must occur to maintain the lead; or (3) strategic position must be shored up in other areas. Planning for the defense of strategic position against technological diffusion takes on high priority if a firm's existing position is heavily dependent on technological barriers.

ACCUMULATION OF EXPERIENCE

In some industries, whose characteristics were identified in Chapter 1, unit costs decline with experience in manufacturing, distributing, and marketing the product. The significance of the learning curve for industry competition is dependent upon whether firms

[7]Some firms have been successful through defensive innovation and patenting. If the firm can discover and patent the best alternative technologies as well as the one they use, the difficulty of the entrant is greatly increased. Such strategies have been followed by Bulova with the Accutron watch and Xerox with Xerography.

with more experience can establish significant and sustainable leads over others. For these leads to persist, firms that are behind must be unable to catch up by copying the methods of leaders, buying new and more efficient machinery the leaders may have pioneered, and so on. If firms that are behind can leapfrog, the leaders may be at a disadvantage from bearing the expense of research, experimentation, and introduction of new methods and equipment in the first place. The tendency for proprietary technology to diffuse works against the learning curve to some extent.

When experience can be kept proprietary, it can be a potent force in industry change. If the firm is not gaining experience the fastest, it must prepare strategically to either practice rapid imitation or build strategic advantages in other areas besides cost. Doing the latter requires the firm to adopt generic strategies of differentiation or focus.

EXPANSION (OR CONTRACTION) IN SCALE

A growing industry is, by definition, increasing its total scale. This growth is usually accompanied by increases in the absolute size of the leading firms in the industry, and firms gaining market share must be increasing in size even more rapidly. Increasing scale in industry and firm has a number of implications for industry structure. First, it tends to widen the set of available strategies in ways that often lead to increased economies of scale and capital requirements in the industry. For example, it may allow larger firms to substitute capital for labor, adopt production methods subject to greater economies of scale, establish captive distribution channels or a captive service organization and utilize national advertising. Increasing scale also can make it feasible for an outsider to enter the industry with substantial competitive advantages by being the first to adopt such changes.[8]

The way in which increasing scale operates on industry structure is illustrated by light aircraft in the 1960s and early 1970s. In this industry, growth allowed Cessna (the industry leader) to shift its production process from job shop to quasi-mass production. This change resulted in a cost advantage for Cessna because it reaped economies of scale in mass production as yet unavailable to its major competitors. If Cessna's two leading competitors also reach the scale

[8]Contraction of industry scale has the reverse effects.

to begin more capital-intensive mass production, barriers to entry into the industry by outsiders will increase markedly.

Another consequence of industry growth is that strategies of vertical integration tend to become more feasible, and increased vertical integration tends to elevate barriers. Increasing industry scale also means that suppliers to the industry are selling it larger volumes of goods, and the industry's customers as a group are purchasing larger quantities. To the extent that *individual* suppliers or buyers are increasing their sales or purchases as well, there may be temptations for them to begin forward or backward integration into the industry. Whether or not integration actually occurs, the bargaining power of suppliers or buyers will go up.

There may also be a tendency for large industry scale to attract new entrants, who can make it tougher for existing leaders, particularly if the entrants are large, established firms. Many large firms will enter a market only after it has reached a significant absolute size (to justify the fixed costs of entry and make a material contribution to their overall sales), even though they have been probable potential entrants right from the industry's birth as a result of skills or assets they bring from their existing businesses. For example, in the recreational vehicle industry the initial entrants were new firms started from scratch and relatively small diversifying mobile home producers whose production process was similar to that of making recreational vehicles. As the industry got large enough, big farm equipment and automotive companies began to enter. These firms had ample resources for competing in recreational vehicles drawn from their existing operations, but they left it to the smaller firms to develop the market and prove that a significant market existed before they entered.

CHANGES IN INPUT COSTS AND EXCHANGE RATES

Every industry uses a variety of inputs to its manufacturing, distribution, and marketing process. Changes in the cost or quality of these inputs can affect industry structure. The important classes of input costs subject to change are the following:

- wage rates (encompassing the full costs of labor);
- material costs;
- cost of capital;

- communication costs (including media);
- transportation costs.

The most straightforward effect is in increasing or decreasing the cost (and price) of the product, thereby affecting demand. For example, the cost of producing movies has risen quite markedly in recent years. This rise is squeezing independent producers relative to well-financed movie companies, particularly since movie tax shelters have been circumscribed by 1976 tax legislation. This development has cut a major avenue of financing for independent producers.

Changes in wage rates or capital costs may change the shape of the industry's cost curve, altering economies of scale or promoting substitution of capital for labor. Escalating labor costs in service calls and deliveries are fundamentally affecting strategy in many industries. Changes in the cost of communication or transportation can promote reorganization of production, which affects entry barriers. Changes in communication costs may lead to use of different cost-effective selling media (and thereby changes in the level of product differentiation), changed distribution arrangements, and so on. In addition, changes in transportation costs can shift geographic market boundaries, which either increases or decreases the effective number of competitors in the industry.

Exchange rate fluctuations can also have a profound effect on industry competition. The devaluation of the dollar against the yen and many European currencies, for example, has triggered significant shifts in position in many industries since 1971.

PRODUCT INNOVATION

A major source of industry structural change is technological innovations of various types and origins. Innovation in product is one important type. Product innovation can widen the market and hence promote industry growth and/or it can enhance product differentiation. Product innovation also can have indirect effects. The process of rapid product introduction, and associated needs for high marketing costs, may itself create mobility barriers. Innovations may require new marketing, distribution, or manufacturing methods that change economies of scale or other mobility barriers. Significant product change can also nullify buyer experience and hence impact purchasing behavior.

Product innovations can come from outside or inside the industry. Color television was pioneered by RCA, a leader in black and white television. However, electronic calculators were introduced by electronics companies and not mechanical calculator or slide rule producers. Thus forecasting product innovations involves examining possible external sources. Many innovations flow vertically, originated by customers and suppliers, where the industry is an important customer or source of inputs.

An example of the influence of product innovation on structure is the introduction of the digital watch. Economies of scale in producing digital watches are greater than those in producing most conventional watch varieties. Competing in digital watches also requires large capital investments and an entirely new technological base compared to conventional watches. Thus mobility barriers and other aspects of the structure of the watch industry are changing rapidly.

MARKETING INNOVATION

Like innovations in product, those in marketing can influence industry structure directly through increasing demand. Breakthroughs in the use of advertising media, new marketing themes or channels, and so forth can allow reaching new consumers or reducing price sensitivity (raising product differentiation). For example, movie companies have boosted demand by advertising movies on television. The discovery of new channels of distribution can similarly widen demand or raise product differentiation; innovations in marketing that make it more efficient can lower the cost of the product.

Innovations in marketing and distribution also have effects on other elements of industry structure. New forms of marketing can be subject to increased or decreased economies of scale and hence affect mobility barriers. For example, the shift in marketing wine from low-key magazine advertising to network television has raised the mobility barriers in the wine industry. Marketing innovations can also shift power relative to buyers, and affect the balance of fixed and variable costs and hence the volatility of rivalry.

PROCESS INNOVATION

The final class of innovation that can change industry structure is that in the manufacturing process or methods. Innovations can

make the process more or less capital intensive, increase or decrease economies of scale, change the proportion of fixed costs, increase or decrease vertical integration, affect the process of accumulating experience, and so on—all of which affect industry structure. Innovations that increase scale economies or extend the experience curve beyond the size of national markets can lead to industry globalization (see Chapter 13).

An example of the way in which interacting evolutionary processes can trigger manufacturing changes is found in changes occurring in the computer service bureau business in 1977. Computer service bureaus provide computer power and a library of programs to a wide variety of users, including those in business, education, and financial institutions. Traditionally service bureaus have been local or regional organizations serving primarily smaller businesses with simple computer packages in areas like accounting and payroll. However, a substitute product, the minicomputer, has made cheap computer power easily accessible to even small organizations. As a result, forces have been set in motion which are promoting the development of large regional and national service bureaus. First, more sophisticated programs are being developed to differentiate the service bureau from the minicomputer, which require substantial investments. The economies of spreading such investments over a large number of users are promoting concentration. Second, pressure to offer computer power at low cost is putting a premium on efficient use of facilities. This development is adding to the impetus toward national companies to take advantage of time zone changes to make use of off-hours capacity. Third, computer technology continues to increase in complexity, raising technological barriers to establish a service bureau at least in the short run. So all these forces built up in the evolutionary process have led to a change in the manufacturing process of the leading service bureaus.

Manufacturing innovations that change structure can come from outside the industry as well as from within. Developments in computerized machine tools and other manufacturing equipment by equipment suppliers, for example, may lead to increased scale economies in production in an industry. The 1950s innovations by fiberglass producers that led to the use of fiberglass in boats greatly reduced the difficulty of designing and building pleasure boats. This reduction in entry barriers triggered the entry of a large number of new companies into the industry with disastrous consequences for profits, many failing between 1960 and 1962 as the industry under-

went a shake-out. In the metal container industry, suppliers of steel expended substantial resources to help defend steel cans against the inroads of the aluminum can through innovations reducing the gauge of steel and techniques for lower-cost can manufacture. All these examples suggest that the firm must broaden its view of technological change beyond industry boundaries.

STRUCTURAL CHANGE IN ADJACENT INDUSTRIES

Since the structure of suppliers' and customers' industries affects their bargaining power with an industry, changes in their structure have potentially important consequences for industry evolution. For example, there has been substantial chain-store development in the retailing of clothing and hardware in the 1960s and 1970s. As the structure of retailing has become concentrated, the retailers' bargaining power with their supplying industries has increased. Apparel makers are getting squeezed by retailers, who are ordering closer and closer to the selling season and demanding other concessions. Manufacturers' marketing and promotional strategies have had to adjust, and concentration in apparel manufacturing is forecast to increase. The mass merchandising revolution in retailing generally has had similar effects on many other industries (watches, small appliances, toiletries).

Whereas changes in the concentration or vertical integration of adjacent industries attract the most attention, more subtle changes in the methods of competition in the adjacent industries can often be just as important in affecting evolution. For example, in the 1950s and early 1960s record retailers dropped the policy of allowing consumers to play records in the store. The effects of this change in the adjacent recording industry proved to be profound. Since the consumer could no longer sample records in the store, what radio stations played became critical to record sales. However, because advertising rates were becoming increasingly tied to sustained audience size, radio stations were shifting to the "Top 40" format, that is, repeatedly playing only the leading songs. It became extremely difficult to get a new, unproven record aired on the radio. The change in retailing created a powerful new element for the recording industry—radio stations—which changed the strategic requirements for success. It also forced the recording industry to purchase advertising time for new record releases on radio stations, the only sure way to

assure that new recordings were played, and generally increased barriers into the recording industry.

The importance of changes in the structure of adjacent industries points to the need to diagnose and prepare for structural evolution in supplying and buying industries, just as in the industry itself.

GOVERNMENT POLICY CHANGE

Government influences can have a significant and tangible impact on industry structural change, the most direct through full-blown regulation of such key variables as entry into the industry, competitive practices, or profitability. For example, pending national health insurance legislation with cost-plus reimbursement will fundamentally affect profit potential in the proprietary hospital and clinical laboratory industries. Requirements for licensing, an intermediate form of government regulation, tend to restrict entry and thereby provide an entry barrier protecting existing firms. Changes in government pricing regulation also can have a fundamental impact on industry structure. A current example is the profound consequences that have accompanied the shift from legally fixed commissions to negotiated commissions in securities transactions. Fixed commissions created a price umbrella for securities firms and shifted competition from price to service and research. Ending fixed commissions has shifted competition to price and resulted in mass exit from the industry, either through outright failure or mergers. Mobility barriers in the new environment are dramatically increased. Government actions can also dramatically increase or decrease the likelihood of international competition (see Chapter 13).

Less direct forms of government influence on industry structure occur through the regulation of product quality and safety, environmental quality, and tariffs or foreign investments. The effect of many new product quality and environmental regulations, though they surely achieve some desirable social objectives, is to raise capital requirements, elevate economies of scale through the imposition of research and testing requirements, and otherwise worsen the position of smaller firms in an industry and raise barriers facing new firms.

An example of the impact of quality regulation is in the security guard industry. Criticism has mounted over the lack of training that companies give their guards in the use of weapons, arrest techniques,

37

and so on, and legislation to require mandatory training of a specified duration is on the horizon. Although such a requirement will be easily met by the larger companies, many smaller companies may be severely hurt by the increased overhead and the need to compete for higher skilled employees.

ENTRY AND EXIT

Entry clearly affects industry structure, particularly entry by established firms from other industries. Firms enter an industry because they perceive opportunities for growth and profits that exceed the costs of entry (or of surmounting mobility barriers).[9] Based on case studies of many industries, industry growth seems to be the most important signal to outsiders that there are future profits to be made, even though this can often be a poor assumption. Entry also follows particularly visible indications of future growth, such as regulatory changes, product innovations, and so on. For example, the energy crisis and recent proposed legislation to provide federal subsidy have evoked rapid entry into solar heating even though demand for solar heating is still quite low.

The entry into an industry (by either acquisition or internal development) of an established firm is often a major driving force for industry structural change.[10] Established firms from other markets generally have skills or resources that can be applied to change competition in the new industry; in fact this often provides a major motivation for their entry decision. Such skills and resources are very often different from those of existing firms, and their application in many cases changes the industry's structure. Also, firms in other markets may be able to perceive opportunities to change industry structure better than existing firms because they have no ties to historical strategies and may be in a position to be more aware of technological changes occurring outside the industry that can be applied to competing in it.

An example will serve to illustrate. In 1960, the U.S. wine industry was composed primarily of small family firms producing pre-

[9] The decision to enter a new industry is discussed in detail in Chapter 16.

[10] Entry into the domestic market of foreign firms already in the industry elsewhere in the world can also have major structural repercussions: The competitive norms may be very different in foreign markets, and strategic approaches may be very different as well.

mium wines and selling them in regional markets. There was little advertising or promotion, few firms had national distribution, and the competitive focus of most firms in the industry was clearly on the production of fine wines.[11] Profits in the industry were modest. In the mid-1960s, however, a number of large consumer marketing companies (e.g., Heublein, United Brands) either entered the industry through internal development or purchased existing wine producers. They began investing heavily in consumer advertising and promotion for both low-cost and premium brands. Since several of these firms had national distribution through liquor stores because they produced other alcoholic beverages, they rapidly expanded distribution for their brands nationally. Frequent introduction of new brand names became the rule in the industry, and many new products were introduced at the low end of the quality spectrum, which old-line companies had generally downplayed while they developed a name for U.S. wines. The profitability of the industry leaders was excellent. Thus the entry of a different type of firm into the U.S. wine industry has caused or at least speeded up a significant structural change in the industry, and one which the early family-controlled participants in the industry had neither the skills, the resources, nor the inclination to cause themselves.

Exit changes industry structure by reducing the number of firms and possibly increasing the dominance of the leading ones. Firms exit because they no longer perceive the possibility of earning returns on their investment that exceed the opportunity cost of capital. The exit process is impeded by exit barriers (Chapter 1), which worsen the position of remaining, healthier firms and may lead to price warfare and other competitive outbreaks. Increases in concentration and the ability of an industry's profitability to climb in response to industry structural shifts also will be impeded by the presence of exit barriers.

The evolutionary processes are a tool for predicting industry changes. Each evolutionary process is the basis of a key strategic question. For example, the potential impact of government regulatory change on an industry's structure means that a company must ask itself, "Are there any government actions on the horizon that may influence some element of the structure of my industry? If so, what does the change do for my relative strategic position, and how

[11] The only important exception was Gallo, which as a result was to play a major role in the industry.

can I prepare to deal with it effectively now?" A similar question can be formulated for each of the other evolutionary processes discussed above. The set of questions that result should be asked on a repeated basis, perhaps even formally through the strategic planning process.

Furthermore, each evolutionary process identifies a number of key strategic *signals*, or pieces of key strategic information, for which the firm must constantly scan its environment. The entry of an established firm from another industry, a key development affecting a substitute product, and so on should cause a red light to go in the minds of executives charged with maintaining the strategic health of a business. This red light should trigger a chain of analysis to predict the significance of the change for the industry and the appropriate response.

Finally, it is important to note that learning, experience, increasing market size, and several other of the processes discussed above will be operating *even if there are no important distinct events to signal this*. The implication is that regular attention should be given to structural changes that may be resulting from these hidden processes.

Key Relationships in Industry Evolution

In the context of this analysis, *how* do industries change? They do not change in a piecemeal fashion, because an industry is an *interrelated system*. Change in one element of an industry's structure tends to trigger changes in other areas. For example, an innovation in marketing might develop a new buyer segment, but serving this new segment may trigger changes in manufacturing methods, thereby increasing economies of scale. The firms reaping these economies first will also be in a position to start backward integration, which will affect power with suppliers—and so on. One industry change, therefore, often sets off a chain reaction leading to many other changes.

It should be clear from the discussion in this chapter that whereas industry evolution is always occurring in nearly every business and requires a strategic response, there is no one way in which industries evolve. Any single model for evolution such as the product

life cycle should therefore be rejected. However, there are some particularly important relationships in the evolutionary process that I will examine in this section.[12]

WILL THE INDUSTRY CONSOLIDATE?

It seems to be an accepted fact that industries tend to consolidate over time, but as a general statement, it simply is not true. In a broad sample of 151 4-digit U.S. manufacturing industries in the 1963-1972 time period, for example, 69 increased in 4-firm concentration more than 2 percentage points, whereas 52 decreased more than 2 percentage points over the same period. The question of whether consolidation will occur in an industry exposes perhaps the most important interrelationship among elements of industry structure—that involving competitive rivalry, mobility barriers, and exit barriers.

Industry Concentration and Mobility Barriers Move Together. If mobility barriers are high or especially if they increase, concentration almost always increases. For example, concentration has increased in the U.S. wine industry. In the standard-quality segment of the market, which represents much of the volume, the strategic changes described earlier in this chapter have greatly increased barriers to mobility (high advertising, national distribution, rapid brand innovation, etc). As a result, the larger firms have gotten further ahead of smaller ones, and few new firms have entered to challenge them.

No Concentration Takes Place if Mobility Barriers Are Low or Falling. Where barriers are low, unsuccessful firms that exit will be replaced by new firms. If a wave of exit has occurred because of an economic downturn or some other general adversity, there may be a temporary increase in industry concentration. But at the first signs that profits and sales in the industry are picking up, new entrants will appear. Thus a shake-out when an industry reaches maturity does not necessarily imply long-run consolidation.

[12]Industry evolution has implications for the optimal timing of entry into an industry; they are discussed in Chapter 10.

Exit Barriers Deter Consolidation. Exit barriers keep companies operating in an industry even though they are earning subnormal returns on investment. Even in an industry with relatively high mobility barriers, the leading firms cannot count on reaping the benefits of consolidation if high exit barriers hold unsuccessful firms in the market.

Long-run Profit Potential Depends on Future Structure. In the period of very rapid growth early in the life of an industry (especially after initial product acceptance has been achieved), profit levels are usually high. For example, growth in sales of skiing equipment were in excess of 20 percent per year in the late 1960s, and nearly all firms in the industry enjoyed strong financial results. When growth levels off in an industry, however, there is a period of turmoil as intensified rivalry weeds out the weaker firms. All firms in the industry may suffer financially during this adjustment period. Whether or not the remaining firms will enjoy above-average profitability will depend on the level of mobility barriers, as well as the other structural features of the industry. If mobility barriers are high or have increased as the industry has matured, the remaining firms in the industry may enjoy healthy financial results even in the new era of slower growth. If mobility barriers are low, however, slower growth probably means the end of above-average profits for the industry. Thus mature industries may or may not be as profitable as they were in their developmental period.

CHANGES IN INDUSTRY BOUNDARIES

Structural change in an industry is often accompanied by changes in industry boundaries. As discussed in Chapter 1, industry boundaries are a judgmental placement of the dotted line in Figure 8-4.

Industry evolution has a strong tendency to shift these boundaries. Innovations in the industry or those involving substitutes may effectively enlarge the industry by placing more firms into direct competition. Reduction in transportation cost relative to timber cost, for example, had made timber supply a world market rather than one restricted to continents. Innovations increasing the reliability and lowering the cost of electronic surveillance devices have put them into effective competition with security guard services. Struc-

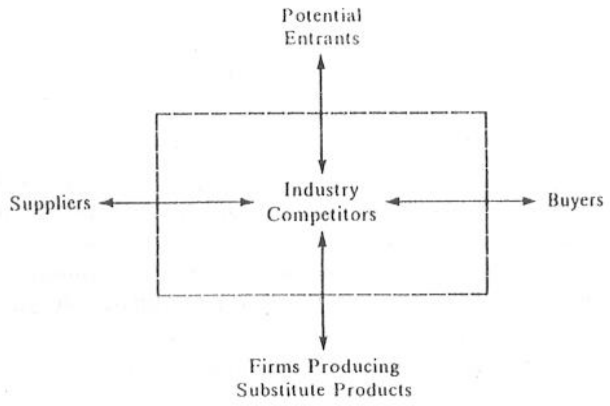


FIGURE 8-4. Industry Boundaries

tural changes making it easier for suppliers to integrate forward into the industry may well mean that suppliers effectively become competitors. Or buyers purchasing private label goods in large quantities and dictating product design criteria may become effective competitors in the manufacturing industry (Sears-Roebuck). Part of the analysis of the strategic significance of industry evolution is clearly an analysis of how industry boundaries may be affected.

FIRMS CAN INFLUENCE INDUSTRY STRUCTURE

As described briefly in Chapter 1 and highlighted here, industry structural change can be influenced by firms' strategic behavior. If it understands the significance of structural change for its position, the firm can seek to influence industry change in ways favorable to it, either through the way it reacts to strategic changes of competitors or in the strategic changes it initiates.

Another way a company can influence structural change is to be very sensitive to external forces that can cause the industry to evolve. With a head start, it is often possible to direct such forces in ways appropriate to the firm's position. For example, the specific form of regulatory changes can be influenced; the diffusion of innovations coming from outside the industry can be altered by the form that licensing or other agreements with innovating firms take; positive action can be initiated to improve the cost or supply of complementary

products through providing direct assistance and help in forming trade associations or in stating their case to the government; and so on for the other important forces causing structural change. Industry evolution should not be greeted as a *fait accompli*, to be reacted to, but as an opportunity.

4
WHARTON REPROGRAPHICS

Pankaj Ghemawat

Sustainable advantage

#86507

"If a man...make a better mouse-trap than his neighbour, tho' he build his house in the woods, the world will make a beaten path to his door." Attributed to one of Emerson's lectures in the nineteenth century, these words seem to have anticipated the exhortations of the twentieth: manage for uniqueness, develop a distinctive competence, create competitive advantage.

"For outstanding performance, a company has to beat the competition. The trouble is the competition has heard the same message."

But that's not all Emerson had to say about investment in better mousetraps; he also remarked, "Invention breeds invention." What will restrain rivals from imitating or even improving on an invention? That question preoccupies the real mousetrap industry as it staggers from imported copies of its innovative glueboards and repeating traps.

That question is also central to competitive strategy. Strategists insist that for outstanding performance, a company has to beat out the competition. The trouble is that the competition has heard the same message. Deadlocks ensue. Look at the cross-industry findings about three competitive hot spots:

1 Product innovation. Competitors secure detailed information on 70% of all new products within a year of their development. Patenting usually fails to deter imitation. On average, imitation costs a third less than innovation and is a third quicker.[1]

2 Production. New processes are even harder to protect than new products. Incremental improvements to old processes are vulnerable too—if consultants are to be believed, 60% to 90% of all "learning" ultimately diffuses to competitors. Production often blurs competitive advantage: recent studies show that unionized workers pocket two-thirds of the potential profits in U.S. manufacturing.[2]

3 Marketing. Nonprice instruments are usually ascribed more potency than price changes, partly because they are harder to match. Rivals often react to a particular move, however, by adjusting their entire marketing mix. Such reactions tend to be intense; limited data on advertising suggest that the moves and countermoves frequently cancel out.[3]

In principle, threats like these have always been part of doing business. In practice, they have multiplied with the intensification of domestic and international competition. How should a business cope with such competitive pressure? For guidance, we can turn from cross-industry findings to cases.

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Keeping the edge

This study of sustainable success grew out of a sample of 100 businesses that far outperformed their industries in the recent past. Not all of them promise to be as successful in the coming decade. The vulnerable ones have a lesson to impart.

Analog Devices, which focuses on specialized applications for analog semiconductors, has invested countercyclically to cash in on business upturns. The results: 80% faster growth and 50% higher profitability than the rest of the semiconductor industry. But existing competitors seem set to copy Analog's investment policy, and new ones—notably the Japanese—are invading its profitable niches.

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Nike's leadership in athletic shoes was built on cheap Far Eastern labor and massive investments in product development and marketing. Over the last five years, Nike averaged thrice the profitability and four times the growth of the rest of the U.S. shoe industry. But competitors are busy cloning its strategy. Reebok International, for one, sources 95% of its shoes from South Korea, spends heavily on product styling, and has won endorsements from rock stars as well as athletes. Reebok's sales and profits expanded fivefold in 1985, while Nike's actually declined.

Piedmont Aviation's hubs at Baltimore, Charlotte, and Dayton tie together dozens of small and mid-sized cities. Since the major airlines had neglected these routes, Piedmont grew three times as fast as the rest of the industry and was six times as profitable. But others are now muscling in: People Express has started to encroach, and American Airlines' planned hub at Raleigh will hurt Piedmont's operations out of Baltimore and Charlotte.

Analog Devices, Nike, and Piedmont are very different from one another, yet they face the same threat: copying by competitors. Their competitive advantages are insecure, or contestable, because each can be duplicated. These examples also show that some success stories do revolve around contestable advantages: all of a company's competitors may be stupid some of the time. But can you count on your competitors being stupid *all* of the time? The historical record suggests otherwise. That is why sustainable advantages – advantages anchored in industry economics – command attention.

The literature on strategy is crammed with accounts of why a sustainable competitive advantage is A Good Thing To Have. But all those accounts beg two key questions: Which advantages tend to be sustainable, and why?

Sustainable advantages fall into three categories: size in the targeted market, superior access to resources or customers, and restrictions on competitors' options. Note that these advantages are nonexclusive. They can, and often do, interact. The more of them, the better.

Benefits of size

Size advantages exist because markets are finite. If a business can commit to being large, competitors may resign themselves to remaining smaller. What holds them back is the fear that if they matched the leader's size, supply might exceed demand by enough to make the market unprofitable for everyone.

Commitment to being large means making durable, irreversible investments. To exploit commitment opportunities, a business must be able to preempt its competitors. Caveat preemptor: first-movers have to be especially wary of environmental changes that can erode the value of their early investments.

"My big mistake was sticking to my last."

Size is an advantage only if, net net, there are compelling economies to being large. Such economies have three possible bases: scale, experience, and scope.

Scale economies usually summon up a vision of a global factory running flat out. But it is important to remember that scale can work on a national, regional, or even local level, and that its effects need not be confined to manufacturing.

Wal-Mart, the discount merchandiser, illustrates the power of local and regional scale economies. Historically, it focused on small Sunbelt towns that its competitors had neglected. Most of these towns could not support two discounters, so once Wal-Mart made a long-lived, largely unrecoverable investment to service such a town, it gained a local monopoly. The company reinforced this advantage by wrapping its stores in concentric rings around regional distribution centers. By the time competitors realized that this policy cut distribution costs in half, Wal-Mart had preempted enough store sites to render competing regional warehouses unviable. Now you know why Sam Walton is one of the richest men in America.

The Wal-Mart story also shows the limits to scale economies. K mart and other discounters are beginning to enter some of Wal-Mart's larger locations. The problem, ironically, is market growth: because of the boom in the Sunbelt, some of these towns

can now accommodate two discounters. And even the warehousing advantages look insecure in the regions into which Wal-Mart is expanding; it probably won't be able to blanket these areas with stores before competitors move in.

Experience effects are based on size over time, rather than size at a particular point in time. If you think about it, experience is a kind of irreversible, market-specific investment. While it is usually cited in the context of the experience curve – the inverse relation between cumulative production and average cost – its ambit is actually much broader. For example, experience has been shown to increase the operating reliability of processing plants, the success rate of product introductions, and the marketability of high-tech products.

Experience effects – especially experience curves – have come under heavy fire recently because they were oversold in the 1970s. Yet some companies *have* parlayed them into competitive success. Take Lincoln Electric's experience in the electric welding industry. Ever since John Lincoln developed the portable arc welder in 1895, Lincoln Electric has outraced its competition down the experience curve. In its ninth decade it still commands a 7% to 15% cost advantage over its four largest rivals.

Lincoln is an object lesson about when and how to exploit experience effects. As the product pioneer it had a first-mover advantage; and that lead has proved durable because of the incrementalism of technological change. Lincoln has also kept its experience proprietary by integrating backward, customizing its production machinery, and holding annual worker turnover under 3%. Finally, it has continued to invest in experience by sharing cost reductions with customers. Competitors complain publicly that they have trouble matching Lincoln's prices, let alone undercutting them.

Scope economies are derived from activities in interrelated markets. If they are strong, a sustainable advantage in one market can be used to build sustainability in another. The term scope economies isn't just a newfangled name for synergy; it actually defines the conditions under which synergy works. To achieve economies of scope, a company must be able to share resources across markets, while making sure that the cost of those resources remains largely fixed. Only then can economies be effected by spreading assets over a greater number of markets.

Cincinnati Milacron, the largest U.S. machine tool manufacturer, shows how companies can capitalize on scope economies. For the last two decades it has led the U.S. machine tool industry in both R&D and the size of its sales and service networks – activities that account for a third of the value added by the industry. In the 1980s it has pushed hard into robotics, with good reason. Its cumulative R&D experience gives the company such a big lead in the machine tool segment that no domestic challenger can rationally commit to matching its R&D, sales-force, or service expenditures. Furthermore, the technologies and customers for its computerized, numerically controlled machine tools overlap with those for robotics. And the company's R&D, sales, and service activities are all very volume sensitive, which slashes the incremental costs of moving into robotics. These factors make it a formidable contender in the industry.

A company pursuing a sustainable scope advantage cannot afford to run its businesses as isolated units. Activities have to be coordinated and allowances must be made for contributions from one business to the success of another. This makes scope economies especially hard to implement.

Access advantages

Preferred access to resources or customers can award a business a sustainable advantage that is independent of size. The advantage persists because competitors are held back by an investment asymmetry: they would suffer a penalty if they tried to imitate the leader.

Access will lead to a sustainable advantage if two conditions are met: it must be secured under better terms than competitors will be able to get later, and the advantage has to be enforceable over the long run. Enforceability can come from ownership, binding contracts, or self-enforcing mechanisms such as switching costs. Without enforceability, the terms of access shift in line with overall market conditions, wiping out any competitive differences.

Enforceability can be a two-edged sword, however. The risk of pursuing sustainable access advantages is that they may saddle a business with worse terms than those available to its rivals.

Know-how. Superior access to information may reflect the benefits of scale or experience. Boeing, for instance, has acquired superior know-how about commercial jet aircraft through billions of dollars of cumulative investments in R&D. More often, though, sustainability hinges on hidden know-how – what your rivals don't see. For example, IBM's size and the complexity of its operating environment make it hard for competitors to figure out exactly what makes it tick. If the cost of surmounting that kind of informational barrier exceeds the payoffs, rivals may not even attempt imitation.

Consider Du Pont's preemption of all the capacity expansion in the U.S. titanium dioxide in-

Research method

I have drawn many of my examples from research reports prepared by MBA students for the Industry and Competitive Analysis (ICA) course at the Harvard Business School. Constraints of space preclude individual citations; I should, however, emphasize the collective contribution of ICA students to this article.

In fall 1984 and 1985, we asked our students to analyze companies identified as outstanding performers in their industries. The purpose was threefold: to understand the sources of competitive advantage on which these companies relied, to determine why the advantages had proved sustainable, and to assess their future security.

Our students submitted reports on well over 150 companies. Some, obviously, dealt with companies that had been canonized publicly; many others, however, were unfamiliar to the ICA teaching group.

Even more important, the quality of the reports surpassed our expectations. Taken together, they suggest answers to some of the most fundamental questions about strategy formulation. To give these reports the broader circulation they deserve, Douglas Anderson, Michael Porter, and I are editing 20 of them for publication. The compendium will be available in 1987.

dustry in the 1970s. Thanks to a production process based on low-cost feedstock, Du Pont enjoyed a 20% cost advantage over competitors' processes. Mastering the cheaper feedstock technology was a black art–it could be accomplished only by investing $50 million to $100 million and several years of testing time in an efficiently scaled plant. The cost and risk of this alternative kept Du Pont's competitors from trying to imitate its demonstrably superior technology.

An obvious but important point: know-how must be kept secret if it is to yield an advantage. Many high-tech and service companies have been devastated by the defection of key personnel in whom their know-how is vested. The Boston Consulting Group, for instance, has suffered more than a dozen spin-offs, eroding its competitive advantage in management consulting and its client base. Other sources of leaks include suppliers, customers, reverse engineering, and even patent documents.

Inputs. Tying up inputs will lead to a sustainable advantage only if the commodity's supply is bounded and the company has the right to use it on favorable terms. Boundedness here is interpreted broadly: it may imply either a strictly limited supply of the input or a supply that is elastic but of varying quality. In both cases, the supply of the preferred input is limited; as a result, tying it up can be very profitable.

This description covers a wide range of phenomena. Courtaulds' 10% to 15% cost advantage over its competitors in the viscose industry can be traced to its backward integration into dissolving pulp, which accounts for a third of the finished product's cost. Courtaulds gets its pulp from a well-located subsidiary for half what its competitors pay. James River Corporation has averaged a 24% ROE by buying obsolete commodity paper machines at fire-sale prices and converting them to specialty products, a stratagem that has held its assets-to-sales ratio to two-thirds the industry average. In diamonds, the Central Selling Organization (controlled by De Beers) has built up its marketing muscle by tying up contracts to market 80% of the western hemisphere's supply.

Companies can also secure preferred access through their reputations or established relationships. In the record industry, for example, CBS has attracted promising artists because of its reputation for being able to take them to the top–at least partially a self-fulfilling prophecy.

Access advantages are vulnerable to shifts in input availability or prices. Courtaulds' cost advantage in dissolving pulp will wither as infrastructural development opens up more tropical and subtropical forests. And James River's competitors, particularly Hammermill, have begun to bid up the prices of the second-hand paper machines that it traditionally bought for a song. This constrains James River's growth, even though its cheap asset base will prop up profitability for years to come.

Markets. In many ways, preferred access to markets is the mirror image of preferred access to inputs. But access to markets relies less on vertical integration or contracts and more on self-enforcing mechanisms such as reputation, relationships, switching costs, and product complementarities.

That is not to say that vertical integration and contracts are entirely missing from the picture. Tele-Communications' strategy in cable television systems shows otherwise. While competitors outbid each other in their scramble to secure big franchises, Tele-Communications concentrated on acquiring small, contiguous systems in areas that were poorly served because they were hard to get to or far from large population centers. Tele-Communications' current network faces no serious threats from substitutes or competitors, limits its exposure to the whims of any one regulatory authority, and allows the company to spread the costs of its microwave common-carrier network over several communities.

Still, self-enforcing mechanisms for market access crop up far more frequently. Let us look at just two examples. Tandem, which pioneered expan-

sible, fault-tolerant computers for processing transactions, has gained preferred access to demand for upgrades and replacements because changeovers from one system to another are very costly. And Borden's brand of processed lemon juice, ReaLemon, attained a 50% premium over identical competing brands because as the pioneer, it benefited from consumer risk-aversion: lemon juice doesn't cost very much and you don't buy it very often, so why take a chance with an untried brand?

You have probably already figured out that market access advantages are very sensitive to customer preferences. Even slight, apparently innocuous shifts in preferences can weaken an entrenched brand, dispel accumulated switching costs, or undercut long-standing relationships.

Exercising options

Sometimes the sustainability of an advantage cannot be pinned on either size or access. Instead, competitors' options may differ fundamentally from yours, hamstringing their ability to imitate your company's strategy. Rivals may be frozen into their current positions for several reasons:

Public policy. Government intervention always affects the workings of markets; that is its avowed purpose. Sometimes its actions percolate so far as to affect competitive positions within an industry. The examples are familiar: patents (try to) protect innovators from imitators, antitrust laws prevent large businesses from being as aggressive as smaller competitors, some companies get handouts while others do not. The lesson, strategically, is that a company that is on the right side of public policy can exploit its position to build sustainability against companies that are not.

Heileman Brewing exemplifies both the leverage from this source of sustainability and its limits. The shakeout in the U.S. brewing industry during the 1970s endangered many small, regional brewers. Antitrust laws prevented the national brewers–Anheuser-Busch, Miller, and Schlitz–from acquiring them. Heileman, then one of the larger regional brewers, faced no such constraints. It grew throughout the decade by buying out numerous smaller brewers lock, stock, and barrel. These cheap assets fed right through to the bottom line: with an average ROE of 29% over the last five years, Heileman is still ahead of its competitors. But the bloom on this particular strategy is fading. By 1982, Heileman's market share had tripled, and the Justice Department blocked its proposed acquisitions of Schlitz and Pabst. Other takeovers by Heileman are improbable.

Remember that what the government gives, the government can take away. Treat an advantage based on public policy as sustainable only if you are sure you will continue to be on the right side. If not, try a different route.

Defense. A business can also sustain an advantage if its competitors are restricted by past investments. If imitation threatens the cash flow from those investments, disadvantaged competitors may rationally stay put and defend them, thereby giving the innovator an opportunity to take the lead.

Examples of defensiveness are legion. Bic used its 19-cent Crystal to wrest leadership from Gillette in the U.S. pen market in the 1950s, when Bic's aggression went unmatched because Gillette did not want to decimate the sales of its more expensive Paper Mate line. In plain-paper copying, a number of competitors successfully attacked Xerox in the 1970s. Recognizing that its multibillion-dollar rental base was becoming obsolete, Xerox milked it by dragging its feet on price cuts and product innovation–even though these lags caused its share of new placements to fall from nearly 100% in 1972 to 14% by 1976.

Time often erodes defensiveness, however, as it depreciates the value of past investments. In 1970, Gillette introduced a low-priced line of Write Bros. pens to arrest Bic's advance. And since 1977, Xerox has restored its share of new copier placements to the 40% to 50% range by matching competitors' prices and product features.

"All of your competitors may be stupid some of the time–but can you count on them being stupid all of the time?"

Response lags. The final restriction on rivals' options comes from response lags. One business can be every bit as efficient as another in terms of potential size or access without being equally prepared to make a specific move. In that event, the nimbler of the two can count on a lag in its competitor's response, or a period of sustainability.

The longer the response lag the better, as existing advantages stretch out and opportunities to create new ones multiply. Lag times vary enormously, of course, but I can make some broad generalizations. Responses to most pricing moves come in weeks if not days, while responses to nonprice competition and to R&D usually take a few years. And it may take a de-

cade or more to match a competitor's scope economies or superior organization.[4]

Kodak vividly illustrates how you can sustain a lead by exploiting competitors' response lags. In the late 1950s, Du Pont and Bell & Howell formed a joint venture to challenge Kodak's dominance of the color film market. They found product development exasperating, however, because each time they improved their film, Kodak seemed, as if by magic, to make its film even better. When the Du Pont-Bell & Howell film was finally ready, Kodak administered the coup de grace by introducing the vastly superior Kodachrome II slide film. The competing entry never reached the market.

Guidelines for strategy

I have outlined a set of factors that affect the sustainability of competitive advantages. How should these factors – and the broad notion of sustainability – be integrated into strategy formulation? Here are several points to remember:

1 Managers cannot afford to ignore contestable advantages. For one thing, even moves that offer ephemeral advantages may be worth making, if only to avoid a competitive *disadvantage*. For another, some contestable advantages may survive uncontested: disadvantaged competitors may be tied up trying to meet their profit targets, constrained by their corporate strategies, or just ineptly managed.

2 The distinction between contestable and sustainable advantages is a matter of degree. Sustainability is greatest when based on several kinds of advantages rather than one, when the advantage is large, and when few environmental threats to it exist.

3 Not all industries offer equal opportunities to sustain an advantage. First-mover advantages tend to be most potent in industries characterized by durable, irreversible, market-specific assets, either tangible or intangible. Industries that evolve gradually offer more room to sustain advantages than those that are regularly rocked by drastic changes in technology or demand. And sustainability is more accessible in industries with more than one dominant strategy because competitors may not have the same options you do.

4 To create a sustainable advantage, you must either be blessed with competitors that have a restricted menu of options or be able to preempt them. Propitious times to preempt occur when an industry is undergoing wrenching changes in technology, demand patterns, or input availability. Scan the environment actively. If you notice any changes, see whether they play to your particular strengths.

Ultimately, the search for sustainability involves a series of decisions about the degree to which you are willing to commit your business to a particular way of doing things. You have to pick the relative emphasis you are going to place on two things: commitment to competing a particular way and retaining the flexibility to compete effectively in other ways.

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Editor's note: Additional references are available from the author.

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WHARTON REPROGRAPHICS 5

Canon Inc.: Worldwide Copier Strategy

Yoko Ishikura, DBA candidate, prepared this case under the supervision of Professor Michael E. Porter as the basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation.

In 1983 Canon was the second-leading manufacturer of plain paper copiers (PPCs) in the world, with copier revenues of $1.026 billion in 1982. Copier sales had increased over 25 times since 1973, and during the same period Canon had gradually broadened its line from two low-volume models to a wider product range.

Canon's aim was to become the world's leading plain paper copier manufacturer in the 1980s. Its long-range goal was to achieve at least a 30% unit share in the three major markets: Japan, the United States, and Europe. In pursuing its goal, Canon faced a highly competitive and changing industry in which the players were making moves on a worldwide basis.

History of Canon's Copier Business

Canon's entry into the business machines field had begun in 1959 with the introduction of micrographic equipment. However, development work on plain paper copiers started in 1962 when an R&D organization dedicated to electrophotography was established. This group was led by Dr. Keizo Yamaji, senior managing director in charge of the Business Machines Group. Yamaji recalled those early years:

Illustration by Jane Simon

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> To us engineers, the only copying technology worth developing was the indirect electrostatic process because we knew that its reproduction quality, speed, economy, and ease of maintenance were superior to those of other technologies available for copying, such as thermographic, direct electrostatic, and diazo. Xerox technology, however, was protected by hundreds of patents. One of the biggest tasks for us was to develop a new technology, independent of Xerox's patents.

Although it was working on indirect electrostatic copying, Canon first entered the copier industry with a coated paper copier (CPC) called the Canofax 1000. The machine was based on technology licensed from RCA, and was introduced in Japan in 1965. In 1968, Canon licensed liquid toner technology from an Australian company. Combining the RCA process and liquid toner, Canon introduced the CanAll series of CPCs in 1968. A separate company—International Image Industry—was established in 1968 to sell the CanAll series in Japan; in the United States, the series sold on an OEM basis to Scott Paper, which marketed it under the Scott brand. The CanAll series was not sold outside of Japan and the United States.

The NP System

By the late 1960s, Canon had succeeded in developing the New Process (NP)—the first alternative to xerography for plain paper copying. The basic design for the NP system was completed and the patent application filed in 1965; the complete process was announced in 1968. NP technology employed a clear insulating layer to seal the chemical layer to the surface of the photosensitive drum. This design lengthened the drum's life and reduced the risk of discharging toxic chemicals. The system employed cadmium sulphide (CdS) as the photoreceptor, which had greater light sensitivity than selenium (Se). NP technology was protected by approximately 500 patents.

Hiroshi Tanaka, director and group executive of the Reprographic Products Group, recalled Canon's research effort:

> Engineers working on the plain paper copying project thoroughly investigated the patents held by Xerox. In the process, we learned how not to violate patents and how to obtain patents to protect our own technology. The NP technology was completely free of Xerox's patents.

The first copier using the NP system—the NP1100—was introduced in Japan in 1970 and in overseas markets (except the United States and Canada) in 1972. The NP1100 used dry toner and made 10 copies per minute. (*Exhibit 1* describes the sequence of Canon model introductions over time.) It was positioned against the Xerox 720. In the early years, Canon licensed the NP technology to Addressograph/Multigraph (AM) for an initial fee of $1 million. Canon supplied AM with machines while AM was developing its own NP-based machine.

A second-generation NP system was launched in Japan in 1972 with the model NPL7, and introduced in overseas markets in 1974. This generation used liquid toner and was known as the *liquid dry system*. The system eliminated a complex heat-fusing mechanism, simplified developing and cleaning, and made toner supply easier. Compared with Xerox, production costs were lower, the machines were more compact and more reliable, and copy quality was as good or better. Canon licensed second-generation NP technology to AM and Saxon in 1972, to Ricoh in 1975, and to Copyer in 1977. Canon's income from patent royalties between 1975 and 1982 was an estimated $32 million.

In Japan, Canon initially sold copiers through its Business Machines Sales organization, established in 1968 for direct sale of calculators. Approximately 30 salespeople sold the NP1100 to large private and government users with copy volumes of 10,000 copies per month. Canon sold its copiers outright, and it offered a Total Guarantee System under which the copy charge included paper, toner, and maintenance.[1] In contrast, Fuji Xerox rented its machines and had many pricing structures depending upon the type of the model and the copy volume. Approximately 15 Canon service representatives serviced NP copiers.

In 1971 Canon Business Machine Sales was integrated with Canon Camera Sales to form Canon Sales, and the copier sales and service force was expanded to include about 200 people. To supplement direct selling, a dealer network was established beginning in 1971.

1. Due to its price fluctuations, paper was later excluded from the Total Guarantee System.

Canon had more than 50 dealers handling calculators throughout Japan at the time; 20 to 30 of those in major cities were initially selected to carry NP copiers. Service of copiers sold by dealers was initially provided by Canon Sales. However, dealers soon took over the service function after receiving certification based on extensive training of their servicepeople by Canon's service engineers.

Marketing of the NP copier in the United States did not start until 1974. Seven wholly or majority-owned sales subsidiaries for direct selling were established by Canon U.S.A. in metropolitan areas, and a network of independent dealers was also established. Sales subsidiaries paid the same prices for machines as dealers did. Canon U.S.A. also experimented with a small direct sales force of its own in California and in Lake Success, New York, but this was soon abolished.

In Europe, copier marketing began in 1972 through Canon's European headquarters in Amsterdam. Canon Amsterdam selected one business machine distributor per country as the sole agent for Canon PPCs. European distributors sold Canon copiers mainly through direct sales forces. Canon's early sales in Europe were modest.

Canon also began exporting NP copiers to other areas of the world. Canon depended upon Marubeni, a trading company, to handle marketing in the Middle East, Africa, and Communist countries. Marubeni, together with Canon, selected one distributor in each country. In some countries, distributors sold copiers directly; in others, they appointed dealers.

Initially, all Canon's copiers were manufactured in Japan at the Toride factory, which had been established in 1960 to make cameras. By 1973 Toride specialized exclusively in business machine production. In 1971 a business machine plant was constructed in Costa Mesa, California, to produce calculators, liquid toner, and drums. In 1972 Canon established a plant in Giessen, West Germany, to produce low-volume PPCs as well as drums and toner—with an initial copier production capacity of 1,500 per month. In 1975 the production level at Giessen was doubled.

Canon's product line began to expand during the 1970s. In 1973, an NP color copier was announced. Black-and-white console copiers using dry toner were also introduced—the NP5000 in 1975 and the NP5500 in 1977. Laser beam printing technology using the NP process was developed in 1975. In addition to marketing laser beam printers, Canon licensed the technology to an American company and two Japanese companies.

More low-volume liquid dry models were also introduced. Canon launched the low-volume microprocessor-controlled NPL5 (NP50 overseas) in 1976. The NPL8, introduced in 1978, featured a microcomputer control system called Micronics, which monitored and controlled the entire copying process from paper insertion to the final production of copies.

Canon first entered the high-volume PPC market in 1978 with its image-retention system. The first model (the NP8500) made 77 copies per minute and was targeted against the Xerox 9200.

In 1979 Canon introduced the Toner Projection Development (TPD) system. TPD employed single component toner and copied a superior image onto ordinary paper—unlike other single-component toner models, which required specially treated or calenderized paper to obtain good copy quality in humid environments. The TPD system was also easier to operate and more reliable than competing machines because the user did not have to maintain a proper balance between the two components of the toner. TPD also reduced the number of parts relative to comparable units.

The NP200—the first PPC with the TPD system—was introduced in Japan in 1979. About the size of a standard office typewriter, it made 20 copies per minute and incorporated fiber optics imaging and microprocessor control. The NP200 was awarded a gold medal as the most productive and economical copier at the Leipzig Fair in 1981 and was by far the most popular model in Canon's history.

The NP120 with cold pressure fusing was introduced in 1980. Cold fusing differed from conventional heat fusing by using a pressure roller to transfer the toner onto paper, making cool copies. The process consumed less electricity (one-fourth), reduced the risk of overheating, and eliminated warm-up time.

The medium-volume NP400, introduced in 1981, offered reduction, enlargement, sorting, and feeding capabilities. A second high-volume model (the NP8500 Super), introduced the same year, was the fastest copier in the world. The NP8500 Super, like the NP8500, did not incorporate stapling or automatic duplexing

features available in Xerox, Kodak, and IBM machines.

Canon's distribution for copiers was evolving as its product line expanded. In Japan, the size of the dealer network increased. In addition, the types of distribution channels were broadened to include new types of dealers and additional direct sales forces. In the United States, the four largest sales subsidiaries were acquired while the dealer network was expanded.

In Europe, extensive dealer distribution began in 1977 with the introduction of the NP50, and European sales began to increase substantially. In addition, Canon gradually began taking over the distribution function from distributors in a number of European countries. It also established Canon Copier Australia (to take over distribution from a joint venture it previously had in Australia) and Canon Singapore (to replace a distributor in Singapore).

Developments from 1980 to 1983

In 1980, Canon acquired 20% of Copyer's stock. Copyer was a public company that manufactured diazo copiers, diazo-sensitized papers, coated paper copiers, coated papers, and plain paper copiers; it was known also for its extensive distribution network. Copyer had first come to Canon for a technology license, which was granted. In the late 1970s, however, Copyer fell behind in R&D and manufacturing, and its operating results deteriorated. At the suggestion of its financial institutions, Copyer sought a stronger link with Canon. In 1981 Canon began assembling copiers in one of Copyer's plants. That same year, Copyer's marketing was taken over by Copyer Sales Company—a 50/50 joint venture of Copyer and Canon Sales. In 1982 Canon acquired an additional 20% of Copyer's stock.

In late 1982 Canon introduced personal cartridge copiers—the PC10 and PC20. Smaller than an electric typewriter, they were the most compact and lightweight PPCs in the world and featured the world's first cartridge copying system. After making 2,000 copies, the user replaced a cartridge containing a photoreceptive drum, charging device, toner assembly, and cleaner—thereby eliminating the need to maintain the copier regularly. Cartridges came with a choice of three toner colors. The PC10's list price was $995, and the PC20's was $1,295; the cartridges were priced at $65 for black toner and $70 for colors.

The newest product announced by Canon was a laser copier. Unlike a conventional copier in which the image was transmitted directly to the print mechanism, the laser copier converted the original image to an electrical signal and transmitted it to the print mechanism. The machine could serve as facsimile transmitter by sending the digitized image through a local network to be copied on a printer located elsewhere. The laser copier could also manipulate the original image—enlargement or reduction, masking of the image to prevent black borders, and other features. The laser copier was announced in Japan in 1982, and in the United States in July 1983. Although such competitors as Xerox, Ricoh, U-Bix, and Sharp had laser copiers, Canon's had a unique combination of high resolution, TPD, high speed, and compact size.

Canon's Strategy in 1983

Product Line

In 1983, Canon's copier line consisted of more than 10 models, ranging from the PC10 to the soon-to-be-introduced laser copier. As many as five different versions of each model were manufactured (to accommodate different countries' electrical standards). Canon also manufactured the world's fastest full-color copier and the only color PPC produced in Japan. Canon had stressed color copying more than any other manufacturer, and it operated color copying service centers in 60 European and 22 U.S. cities as well as 150 locations in Japan. In late 1982, Canon started shipping color copiers to dealers to allow them to establish their own retail outlets. It was estimated that Canon had shipped about 30 units to the United States and 50 to Europe in the first half of 1983.

In addition to copiers, which accounted for 60%–70% of copier division revenues, Canon sold consumables (mainly toner) and other accessories, representing 20%–25% and 10% of revenues, respectively. Toner and drums were manufactured in-house, while paper was purchased from paper manufacturers. In the United States, paper was purchased exclusively from Hammermill and distributed through five regional warehouses. Hammermill was origi-

nally selected because it was technologically capable of producing paper for liquid toner PPCs and because it was medium-sized. Paper for the European market was bought from paper mills in Finland, Austria, and France.

Distribution

Canon copiers were distributed almost exclusively under the Canon brand name through wholly owned sales subsidiaries throughout the world. Most machines were sold through dealers who received discounts of 30%–50% off the list price. A small volume of copiers was sold by Copyer on an OEM basis in overseas markets.

Japanese market. Sales of Canon copiers in Japan were made through Canon Sales. More than 80% of domestic sales went through dealers; the rest were direct. Canon Sales identified four customer groups: (1) personal copiers, (2) small businesses with 1 to 30 employees, (3) medium businesses with 31 to 300 employees, and (4) businesses with more than 300 employees. Canon targeted PC copiers to groups 1, 2, and 4, and NP copiers to groups 3 and 4. (*Exhibit* 2 shows Canon's PPC distribution system in Japan.)

Canon employed several so-called fleets for distributing PPCs in Japan. Canon Sales had a number of branch offices supervising 700 NP dealers with 4,000 salespeople. Dealers sold copiers for customer groups 2 and 3 and carried Canon almost exclusively. Various incentives were provided for dealers, including a "100-point" and "50-point" dealer system, the "Star Master Club" system, and "master engineer" system. Under the 100-point and 50-point dealer systems, each model was assigned certain points, and dealers whose sales exceeded 100 or 50 points in three months received various incentives—including financing at the prime rate and overseas trips for owners' sons. In addition, management training programs were offered twice a year, and social get-togethers and golf competitions were planned. In 1983, there were approximately 30 100-point dealers and 55 50-point dealers.

There were also many programs for dealers' salespeople and servicepeople. The Star Master Club system awarded dealers' salespeople one star to five stars, depending upon the volume they sold. For servicepeople, a Senior Service Engineer system and overseas training program for master engineers were established. Canon also held a number of events for all its dealers. An annual sales conference was held at which top management announced its plans, and new products were revealed at the Grand Fair, which was held in luxurious hotels in major Japanese cities. NP challenger contests, in which dealers competed against each other on volume, also became a big event in the industry and generated great respect for the winners.

Canon Sales had two subsidiaries—Canon Eiken and Copyer Sales. Canon Eiken, established in 1978, sold low-volume PPCs direct to customers in Tokyo and Osaka via 160 salespeople. Canon Eiken also served as an on-the-job sales training school for Canon management. Copyer Sales had 53 regional sales companies that sold direct via 1,200 salespeople and supervised 200 dealers. Copyer Sales sold under both the Canon and Copyer brands; Canon Sales was also in the process of building a national account sales organization called BC Center (standing for big customer) to sell direct to large establishments with more than 300 employees. The BC Center had 40 salespeople.

Initially, the PC series was distributed solely through office supply stores, most of which carried Canon calculators. Initially, NP dealers were not interested in carrying the PC series because it needed little maintenance and could not accommodate larger paper sizes. Nevertheless, Canon Sales worked actively to create a market for the PC in Japan, stressing such features as color copying and the PC's ability to copy business cards. As the success of the PC series grew, more and more NP dealers began carrying PC copiers.

Overseas markets. In overseas markets, Canon sold primarily through dealers via sales subsidiaries, which had considerable autonomy. (*Exhibit 3* illustrates the distribution systems in the United States, Europe, and other overseas markets.) In 1983, 95% of Canon overseas sales went through Canon U.S.A. (North America), Canon U.K., Canon France, Canon Copylux (Germany), Canon Europa NV (Europe, part of Africa, and the Middle East), Canon Latin America (South and Central America), Canon Singapore (part of Southeast Asia), and Canon Copier Australia. The Copier Export Division accounted for the remaining 5% and handled NP copier sales in parts of the Middle East/Africa, Communist countries, Taiwan, Korea,

and New Zealand. Copiers were exported directly to Taiwan and New Zealand, while trading companies served as intermediaries in other areas. Sole agents were selected in each country.

United States. About 90% of Canon's U.S. sales went through 600 to 700 dealers, ranging from mom-and-pop stores to one dealer with annual revenues of $20 million to $25 million. Canon offered an extensive dealer financing plan in the United States, as well as extensive sales and service training. Dealers were certified to sell Canon copiers only after they had completed service training, and training was offered continuously, with emphasis on new products. Rather than giving special treatment to some dealers (like other Japanese manufacturers did), Canon gave equal treatment to all.

Canon also had three wholly owned sales subsidiaries located in New York, Chicago, and Los Angeles. Sales subsidiaries sold directly to low- and medium-volume users in those metropolitan areas (Canon had no authorized dealers in these areas). Sales subsidiaries employed approximately 550 people in sales and service, and handled other business machines besides PPCs.

A Government Marketing Center was established in Washington, D.C., in 1979 and sold directly to government agencies in Washington; it used 10 salespeople, while 4 other salespeople contacted the purchasing agents of federal government agencies, state governments, schools, and hospitals outside of Washington in cooperation with local dealers. Machines sold by the Center in Washington, D.C., were delivered from Canon's inventory; sales in other areas were shipped from dealers' stock.

A National Account group was established in 1982 to concentrate on major companies and institutions. Approximately 10 salespeople from this group coordinated their efforts with those of dealers. Dealers who made initial contact with major accounts were given some commission, even though major accounts were subsequently handled by the National Account group.

The PC series was initially distributed in the United States only through NP dealers, sales subsidiaries, and the National Account and Government groups. Canon wanted to assure adequate supplies for dealers while production capacity was limited. By mid-1983, however, Canon began selling PCs through competitors' dealers and office supply stores.

It was expected that the PC series would eventually be distributed through additional sales channels, such as computer stores, phone stores, and mass merchandisers. Canon concluded that a separate marketing organization for the PC series would be required, although no decision had yet been made as to whether the series should be under the Copier or Consumer Calculator divisions.

Europe. In Europe, Canon had sales subsidiaries in the United Kingdom, West Germany, and France, as well as Canon Europa. Canon Europa supervised subsidiaries in Italy, Spain, Sweden, Finland, Holland, Belgium, and Austria. In other countries, independent business machine distributors were designated the sole agents for Canon PPCs. (*Exhibit 4* shows Canon's PPC distribution system in major European countries.)

European distribution channels had expanded rapidly since the introduction of the NP200 at the end of 1979, and European sales had increased from 40,000 units in 1980 to 80,000 in 1982. Growth was attributed to the rapid expansion of dealer distribution. European sales in 1982 broke down by country as follows:

France	22%
U.K.	18
West Germany	17
Italy	10
Spain	10
Switzerland	3
Sweden	3
Finland	3
Other	14
Total	100%

In total, 60% to 70% of NP copiers were distributed through dealers in Europe, while the rest were sold direct. New channels had been added since the introduction of the PC series in January 1983, including office supply stores and electric appliance stores.

Canon's aggregate direct sales force of approximately 600 in Europe ranked second to Rank Xerox's 5,000. (Most Japanese manufacturers did not have a direct sales force.) Canon's dealer network numbered 1,300 to 1,400—by far the largest in Europe; Sharp and Minolta followed with approximately 800 each.

Service

Canon provided service in three different ways in various parts of the world: (1) the Maintenance Guarantee System (a direct descendant of the Total Guarantee System), (2) the spot price system, and (3) the copy kit system. Under the Maintenance Guarantee System, consumable supplies and service were provided as a total package. The price consisted of a minimum charge per month and a per-copy charge that depended on copy volume. Under the spot price system, consumables were sold separately and service was provided on an on-call basis. Under the copy kit system, Canon sold a kit containing supplies for 2,000 to 5,000 copies, and service was provided under a three-month to one-year service contract.

The Maintenance Guarantee System and spot price system were offered in Japan, Canon dealers provided service for the machines they sold, while Canon Sales provided service for machines that were sold direct. There were more than 2,000 dealer servicepeople and 300 Canon servicepeople in 1983. Dealer servicepeople recorded copy volume for billing purposes and were supervised by Canon servicepeople.

The Maintenance Guarantee System and the spot price system were offered in the United States. Canon dealers serviced machines sold by them or by the National Account group. Canon had no control over the systems that dealers offered because of U.S. antitrust laws. However, the trend among dealers seemed to be toward the Maintenance Guarantee System. Approximately 20 Canon servicepeople ran training programs, and 20 field service technicians gave on-the-job training to dealer servicepeople. Canon dealers had an estimated 1,800 servicepeople in the United States, the three sales subsidiaries had 200, and the Government Marketing Center had 20.

The Maintenance Guarantee system, the spot price system, and the copy kit system were offered in Europe. PPCs that were sold direct were serviced by Canon and by national distributors in countries without a Canon sales subsidiary, while machines sold by dealers were serviced by dealers' servicepeople. About 10% to 20% of dealers requested that the service for machines they sold be provided by Canon's subsidiaries. Canon had an estimated 3,000 Canon PPC servicepeople in Europe, including those of dealers (compared with Rank Xerox's 7,000).

Marketing

Canon marketed copiers under its own brand name and emphasized technological innovation. Copyer Sales also sold copiers under the Copyer brand. Canon had introduced PPCs with more functions and features for the price. For example, the NP400 had features and performance levels that were associated with segments 3 and 4, while its list price put the model in segment 2. Most other Japanese manufacturers aggressively cut prices to match Canon's price, and they accepted trade-ins of the NP copiers (as Canon did of competitors' machines).

In the five years from 1978 to 1982, Canon spent 3%–5% of PPC sales revenues worldwide on advertising and promotion. Spending varied between different markets as follows:

Market	*Advertising and Promotion as a Percentage of Sales*
Japan	3%–6%
Europa NV	2%–3%
United States	4%–7%
Canon Latin America	4%–6%
Canon Copier Australia	2%–3%
Other	1%

Canon's Japanese advertising expenditures were considered to be modest. In the United States and Europe, however, Canon was the leading advertiser in terms of 1982 media expenditure. Particularly since 1980, Canon had made heavy use of TV and print advertising. In the United States and Japan, the Toner Projection Development series was launched with massive TV campaigns. Japanese spending broke down into 45% TV, 30% print, 10% dealer, and 15% other. In the United States, the breakdown of advertising by medium was 30% magazine, 60% network TV, and 10% other.

In Europe, TV was not employed as extensively as in the United States or Japan because of the lower penetration of TV sets and the high cost of advertising. A TV advertising campaign in a single country could cost as much as a campaign covering the entire United States. Europeanwide advertising by Canon Europa featured general business magazines such as *Time* and *The Economist*, as well as in-flight magazines. Sales subsidiaries in different countries also conducted their own campaigns. A common theme with different execution was

adopted in different countries. Media used in different countries were as follows:

Country	Media
United Kingdom	Print, catalog, radio
West Germany	Print
France	Print, TV
Italy	Print
Spain	Print, TV
Sweden	Print, movie spots

Promotion consisted of trade shows and sports sponsorships. The 1982 Soccer World Cup designated the Canon copier as the official copier. Canon also employed cooperative advertising with dealers. In the United States, Canon paid for 50% of dealers' advertising expense up to 2% of sales in the previous six months. Canon U.S.A. estimated that the ratio of media spending to cooperative advertising was 70:30 in 1982 and 1983. Cooperative advertising programs were also used extensively in Europe, although they were not prevalent in Japan.

Canon also had a corporate advertising campaign featuring the range of Canon products from cameras to copiers. In the United States, corporate ads were run in major publications such as the *Wall Street Journal* and *Business Week*. In Europe, corporate advertising ran in local newspapers and magazines. Japanese corporate advertising was primarily concentrated in newspapers.

The launching of the PC series was backed by heavy advertising. In Japan, $1.4 million was spent on the campaign. The marketing theme was "color innovation in copying." In the United States, $15 million reportedly was slated for the 1983 PC campaign, including media expenditures, dealer cooperative advertising, and sales promotion materials. The theme was "simple and easy." In Europe the principal advertising emphasized the theme of three-color copying. Total spending was heavy, with Canon France using TV spots for the first time to promote the PC copiers.

Marketing programs were discussed by managers from Canon sales subsidiaries who met twice each year at the World Conference that was chaired by the group executive of the Reprographics Products Group. Product group managers traveled frequently overseas, and sales subsidiary managers visited Tokyo regularly. In addition, daily communication took place via telex, telephone, facsimile, and letters.

Manufacturing

Canon copiers were manufactured at three places: (1) the newly expanded Toride factory, (2) a Copyer plant outside Tokyo, and (3) Giessen, West Germany. Toner was produced at Toride and at a plant in Ueno, located in western Japan. A plant in Costa Mesa, California, produced toner and drums. Average worldwide monthly production of copiers was 15,000 in 1980, 20,000 in 1981, and 25,000 in 1982. Although it had taken 10 years to produce the first 500,000 units (1970 to 1980), the next 500,000 were produced between 1980 and 1982. (The approximate cost structures for various copier models are shown in *Exhibits 5* and *6*.)

The Toride factory was expanded and further automated in 1980 at a cost of $13 million to become one of the largest and most automated copier plants in the world. Nearly 30% of the total investment at Toride was in automated equipment. Toride had eight assembly lines, each with a capacity of 3,000 to 8,000 PPCs per month. Assembly lines were built in a circular configuration. Parts and subassemblies were loaded on a multilevel cart that was either suspended from the ceiling or placed on the line. This cart was matched with a copier frame. Assembly-line workers placed parts from the cart onto the copier frame.

A flexible manufacturing system had been developed at Toride to accommodate differences in models and electrical specifications. Any of Toride's assembly lines could handle any NP model after a two-day changeover. It was also possible to assemble any version of a model on any line. PC and NP copiers were not assembled on the same lines, however, because of differences in their production processes.

A "stop and fix it" system was employed in operating assembly lines. Any worker could stop the line, and a troubleshooter on each assembly line would help the worker solve problems at the operation where an error occurred. This system gave workers control over the line and was designed to prevent mistakes from going on to the next stage of assembly.

Approximately 3,000 parts were required to make all the different kinds of NP copiers. A computer scheduling system set the number and type of copiers to be made each morning.

Parts were delivered to the assembly line by unmanned vehicles from automated parts and distribution centers. All the parts to be assembled on a copier frame were placed in a bin on the cart. The system prevented mismatching of parts, economized on space, and sharply reduced parts inventory. In addition, 10 forklifts had been eliminated and worker productivity had increased fourfold since the system was introduced.

Worker groups met several times a month after work to discuss improvements, and an average of four suggestions were made per worker per month. The companywide suggestion system was coordinated by the Canon Production Systems Committee and resulted in $77.5 million savings in 1982, with 20% of these savings coming from the copier business.

Canon had succeeded in improving productivity 30% per year since 1976 through a technique called "value perceived by the customer." The assembly process was divided into three processes: (1) actual assembly, (2) adjustment or fine-tuning, and (3) inspection. Only the assembly operation led to value for the customer; the other processes merely corrected errors. After start-up of a new product, effort was made to minimize fine-tuning and inspection. Assembly was then thoroughly analyzed to cut cost. For example, as the production of a medium-volume copier doubled from 5,000 to 10,000 copiers per month between 1980 and 1981, a 15.5% cost reduction was realized. Of this, 8.6% was estimated to have resulted from scale economies, 5.4% from value engineering, and 1.5% from a labor learning curve.

A unique effort to reduce cost was made in the development of the PC10 and PC20. This involved use of new materials for the photosensitive drum and developing sleeve, a one-third reduction in the number of parts, and a machine design that facilitated automated assembly. The precision of parts fabrication was increased by a factor of 10 to reduce fine-tuning during assembly. An automatic inspection system was also introduced that eliminated the need to make a copy in order to test the quality of PC copiers. At a production rate of 15,000 PCs per month, a 7% cost reduction was achieved in the first six months: 5% was from learning, and 2% was from value engineering. When the production of PC-series copiers was doubled from 15,000 to the target of 30,000 units per month, an additional 4% cost reduction was realized. Of this, 2% was estimated to have resulted from scale economies and learning, and 2% from value engineering.

In addition to the Toride factory, Canon produced copiers on two assembly lines at Copyer and two more lines at Giessen, West Germany. Copyer's plant assembled the NP210 but did not manufacture drums or toner. Production capacity was 5,000 per month, with 3,000 being sold under the Copyer brand and to OEM accounts, and 2,000 under the Canon brand. Since the acquisition of Copyer, technical guidance was provided by Canon's engineers to make Copyer's assembly process similar to Toride's. In the first three months, labor productivity had doubled.

The assembly plant in Giessen had a monthly capacity of 3,000 units, and it built the NP125, NP210, and NP300. PPCs assembled at the Giessen plant were delivered all over Europe and to countries in the Middle East and Africa. Giessen's assembly process was similar to Toride's, but smaller in scale.

Canon attempted to use common parts across different copier models. Parts commonality on adjacent models in 1983 is shown below:

Model	*Percentage of Parts Common to Adjacent Model*
120 and 120RE	60%–70%
120 and 200/300	Small
210 and 300	50%–60%
300 and 400	10%–20%

All PPC drums and toner, in addition to some other parts, were produced in-house. There were three different types of Canon drums: (1) conventional, with a photoreceptor sheet on top of an aluminum cylinder, (2) seamless, with five layers including a CdS layer, a sealer, and three insulating layers, and (3) screen-type, used in the image-retention system. Seamless drums had to be manufactured by an automated process to achieve acceptable quality. Canon had eight drum lines—five at the Toride factory, two at Giessen, and one in California; 30% of the drums manufactured at Giessen were used in copiers assembled there; the remaining drums were used for replacement. Neither Giessen nor Costa Mesa produced screen-type drums.

The manufacturing cost structure (including depreciation) for seamless drums for a medium-

volume copier was estimated by the casewriter to be approximately as follows:

Direct raw materials	15%
Direct labor	15
Depreciation and overhead	60
Packaging	10
Total manufacturing cost	100%

Toner was manufactured mainly in Japan. Canon made five different types: liquid toner, two-component toner, single-component toner for heat-rolled fusing, single-component toner for pressure fusing, and color toner. Canon was one of a few manufacturers that operated a fully automated 24-hour toner production operation, established in 1981. The cost structure for toner for a medium-volume copier in Japan was estimated by the casewriter to be approximately as follows:

Direct raw materials	30%
Direct labor	10
Depreciation and overhead	45
Packaging	15
Total manufacturing cost	100%

Liquid toner was mixed at Costa Mesa and Giessen, but the production level was low because the demand for liquid toner was declining. A feasibility study had been under way at Costa Mesa to produce dry toner. The key issue was whether raw materials of uniform quality were available locally.

The tariff on finished PPCs in 1983 was 4.5% in the United States, 10% in Europe, and 5%–10% in other markets. The tariff on toner was 16%–17% in the United States and 10% in Europe. The tariff for component parts was 7% in the United States and 10.1% in Europe.

From Japan, shipping costs of PPCs were estimated to be 5% of f.o.b. price to the United States and 9% to European countries; shipping costs of toner were estimated to be 2% of their f.o.b. price to the United States and 6%–7% to European countries; and shipping costs of component parts were estimated to be 6%–7% to Europe. If all the components for a copier were shipped to be assembled overseas, shipping costs could be four to five times that of the shipping cost of a finished PPC because components occupied more space.

Purchasing

Backward integration had not been pursued aggressively by Canon in PPCs, in contrast to its strategy in cameras. Canon made only parts that required unique technology, such as drums and toner. Purchased parts were divided into two major groups: electric/electronic parts and mechanical parts. Electric/electronic parts were purchased from major electronics manufacturers; mechanical parts were typically purchased from specialized suppliers. Simpler parts, such as steel plates and molds, were purchased from a group of about 30 suppliers that had been encouraged to locate near the Toride factory.

Canon bought each key part from at least two sources. Canon also tried to produce in-house on a small scale to learn about manufacturing cost. In 1981 it created a Semiconductor Research Division and developed and pilot-produced LSIs. After pilot production was completed at Canon, production was typically transferred to outside vendors. About 250 companies supplied Canon; 50 of those had a close relationship with the company. (Canon had a policy of establishing long-term relationships with its suppliers.) Parts suppliers to Toride also supplied the Copyer plant.

At Giessen, electric/electronic parts that related to the imaging process, the optical system, and some mechanical parts (such as rollers) were imported from Japan because it was very difficult to purchase them locally. Plastic molds, steel plates, and some mechanical parts were purchased locally to reduce cost. The purchasing strategy in Europe was to select suppliers carefully and to establish long-term relationships with them. In the United States, 10% of materials value for toner and drum production was purchased locally, including aluminum cylinders and adhesives.

Research and Development

Canon had emphasized research and development activities from its inception. Canon's R&D organization was divided into three tiers—the Advanced Technology Center, the Canon Research Center, and Product Group Development Centers—depending upon the time horizon of each one's research. The Advanced Technology Center focused on setting technological strategy for the twenty-first century; the Canon Research Center conducted long-term

projects and basic research; and the Product Group Development Centers concentrated on medium- and short-term product development. The Corporate Patent and Legal Center coordinated patent applications and patent intelligence throughout the world.

In the Reprographics Products Group, approximately 550 engineers worked at the Development Center, and 5% of PPC revenue was spent on R&D in 1982. Canon aimed to be a technological leader in PPCs. Patents were employed extensively to attain this goal. In 1982, 2,000 patent applications were filed by engineers at the Reprographics Group Development Center. For the PC series, 470 patents had been obtained, 340 of which were for the cartridge. Canon's policy was not to license the technologies on which its differentiation was based—including Toner Projection and PC technology. For other technologies, cross-licensing with other manufacturers was pursued.

The PC series characterized the product development process at Canon. In 1979, a number of the sales subsidiaries triggered the development of the PC series by suggesting a PPC to meet the needs of emerging markets such as small businesses and homes. From the beginning, the concept was to develop a product that could be sold in high volume on a worldwide basis, like Canon's AE-1 camera. A $1,000 target price was set to provide a significant price gap under competitor machines known to be under development, along with the requirement that maintenance was to be minimized: A feasibility study identified two obstacles: the complexity (which made it expensive) and the delicacy of the mechanism (which made it maintenance-intensive). The concept of making the entire imaging mechanism disposable was developed in the technical analysis.

Market potential was assessed through informal meetings with marketing representatives throughout the world, and the PC series was discussed at the World Conference of marketing managers. By 1980, progress had reached the point where a project team of nearly 200 scientists, engineers, and marketing specialists was formed at headquarters. Four specific development goals were established: size and weight, price, easy maintenance, and the durability of parts other than the cartridge. As PC development proceeded, a major issue emerged: how big a paper size the new copier would accept. Representatives from Canon Sales wanted the copier to accept B4-size paper (a larger-size paper than the letter size) that accounted for 60% of copy volume in the Japanese market. This B4 size was not necessary in overseas markets where A4 was sufficient. Designing the PC to handle B4 added 20%–30% to the cost of the machine, and it threatened serviceability because a cartridge that could handle B4 was more technologically complex. After much discussion, both informally and at the World Conference, Canon Sales was asked to compromise and accept A4. However, the discussions led to the addition of a feature to the PC that allowed it to copy business cards—a feature believed to be desirable in the Japanese market and which involved little added cost.

As the PC development proceeded, three value engineering evaluations were made—at the concept, prototype, and refinement stages. Two months before the announcement of the PC series, an "In My House Test" was conducted in Japan by Canon employees. After the PC was announced in August 1982 in Japan, prospective customers (such as doctors and lawyers) selected by Canon Sales were asked to test the product at their offices. In the United States, field tests were conducted by dealers located in severe climates.

Organizational Structure for Copiers

Exhibit 7 shows Canon's organization in 1983, illustrating the copier organization in more detail. Reprographic Products Group—one of the two subgroups of the Business Machines Group—contained copiers and micrographics. Hiroshi Tanaka, group executive of the Reprographics Products Group, had worldwide product responsibility.

Presidents of Canon's sales subsidiaries had marketing responsibility for their areas. Copier divisions of the sales subsidiaries reported in a matrix structure both to the Reprographic Products Group and to the area sales subsidiaries. The Copier Marketing Management Division of the Reprographic Products Group coordinated the marketing activities of sales subsidiaries throughout the world.

Other Business Machines

In addition to PPCs, Canon produced calculators, facsimile transceivers, Japanese-language word processors, micrographic equip-

ment, electronic typewriters, small business computers, and laser beam printers (LBPs). Canon's goal was to become one of the leading manufacturers of integrated office automation systems in the world. Facsimile transceivers, small business computers, and word processors were expected to be part of the office of the future.

Calculators, facsimile transceivers, Japanese-language word processors, electronic typewriters, and small business computers were produced at the newly established Ami factory near Toride. High-speed laser beam printers were manufactured at a facility near corporate headquarters. There was little sharing of manufacturing between PPCs and other business machines, although low-speed LBPs, micrographics, and PPCs had some common parts such as plastic molds.

Other business machines besides copiers, calculators, and facsimile transceivers were distributed in Japan by a separate group within Canon Sales Inc. Many NP dealers carried other Canon products, and 80% of Canon's 100-point copier dealers sold other business machines. In the United States, however, Canon's copier division sold facsimile transceivers and laser beam printers, but calculators, electronic typewriters, small business computers, and micrographics equipment were handled by separate divisions. The full range of products was distributed through Canon's business machine dealers. In Europe, the copier division also sold facsimile transceivers and laser beam printers, though service was separate from that provided for copiers. Most copier dealers carried facsimile transceivers while approximately 50% of electronic typewriter dealers handled NP and PC copiers.

Future Plans

Canon considered Xerox its major global competitor over the long term. Canon's slogan proposed to "Catch Xerox through technological differentiation." Tanaka discussed Canon's future plans:

> We intend to enter the high-volume market with a multiple-function laser copier that is differentiated from Xerox. Our laser copier would be positioned against the Xerox 9200. The laser copier would become a core product in office automation.
>
> With the PC series, we intend to create a new market for personal use. The PC10 and 20 are expected to become the mass-market product of the Reprographic Products Group, and it seems that our expectations have been met so far. The concept of low cost and reliability made possible by offering replaceable cartridges has been welcomed in every major market. In order to meet the rapidly growing overseas demand, we are shipping PC copiers by air. We also plan to supply mass merchandisers such as Sears with our PC copier. In the future, we plan to offer lighter and smaller versions of the PC series.
>
> The color-copying technology we had developed will be incorporated into all the product lines in the future. For example, it will be possible to offer a PC copier in full color.

Canon's management was concerned with the increasing trend toward protectionism in many countries, since more than 90% of PPCs were produced in Japan in 1982. Though no specific actions had been taken to restrict the PPC imports in overseas markets, any restrictions on imports could cause problems. In order to reduce and avert tensions caused by imports, top management at Canon planned to establish more manufacturing facilities overseas.

In July 1983, Canon announced its intention to establish a wholly owned subsidiary—Canon Bretagne S.A.—to manufacture the PC series in France. Operations were expected to start in fall 1984. After the first year, the new plant was to export to other European countries. Canon was also studying the feasibility of establishing a PPC assembly plant in the United States. Because it involved complex issues in manufacturing, labor, and parts supply, a decision was not expected before 1985.

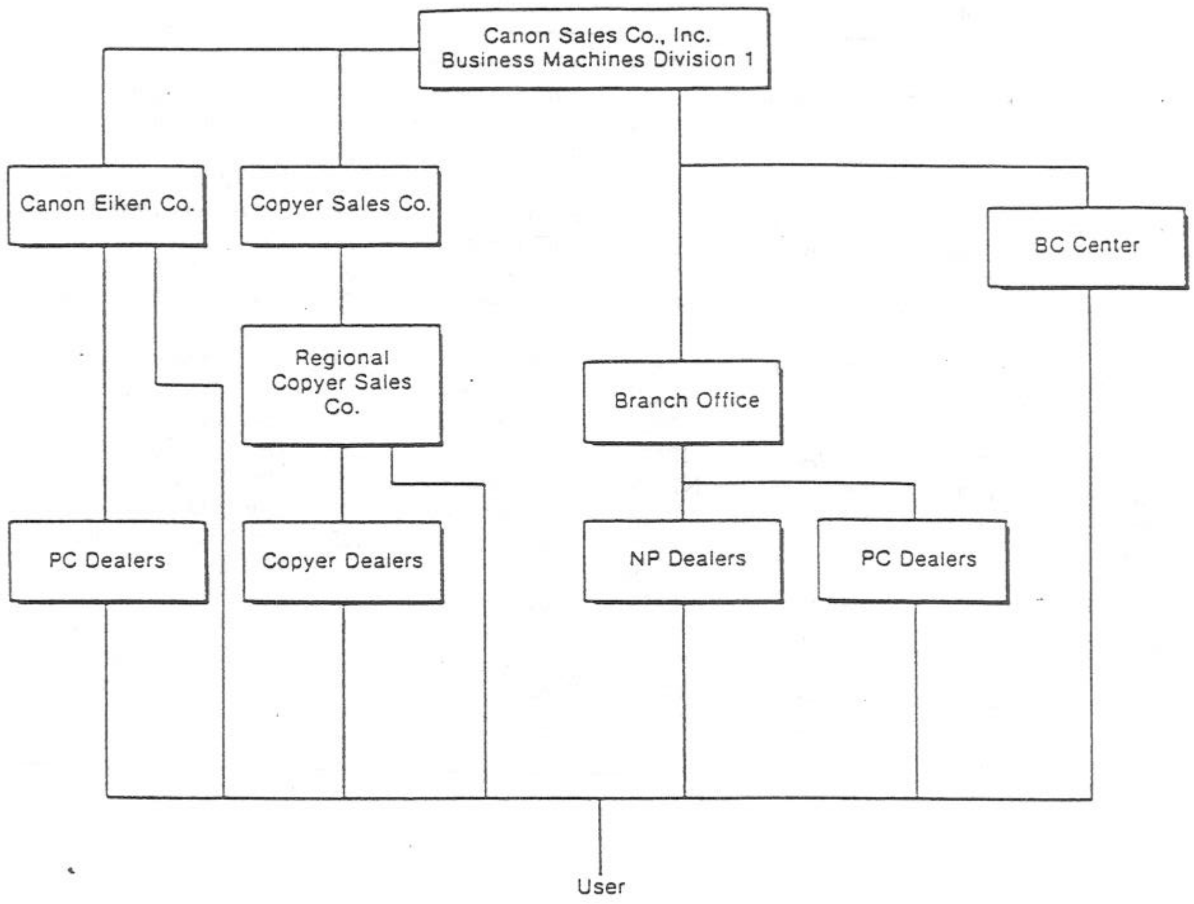
bit 1 Canon PPC Model Introductions

Japan		*United States*		*Europe*		*Copies per Minute*	*Technology*
Model	*Introduction*	*Model*	*Introduction*	*Model*	*Introduction*		
NP1100	1970/October	Not sold		NP1100	1972/September	10	Dry Console
NPL7	1972/November	NP70/NPL7	1974/October	NP70	1973/September	15	Liquid Dry Desk Top
NP5000	1975/April	NP5000	1975/July	NP5000	1975/September	22	Dry Console
NP5100	1976/March	Not sold		NP5100	1976/September	20	Dry Console
NPL5	1976/October	NP50	1977/March	NP50	1977/April	8	Liquid Dry Desk Top
NPL6	1977/November	NP60	1979/January	Not sold		12	Liquid Dry Desk Top
NP5500	1977/November	NP5500	1978/April	NP5500	1977/September	26	Dry 2R Console
NP8	1978/August	NP80	1979/January	NP80	1979/August	32	Liquid Dry Desk Top
NP8500	1978/December	Not sold		NP8500	1979/December	77	Dry Image Retention 2R Floor
NP6000	1978/December	NP6000	1979/October	NP6000	1979/January	33	Dry Console
NP200	1979/July	NP200	1980/January	NP200	1979/October	20	Dry TPD Desk Top
NP3	1979/September	NP30	1980/April	NP30	1980/September	12	Liquid Dry Desk Top
NP120	1980/November	NP120	1981/April	NP120	1981/April	12	Dry TPD Cold Pressure
NP400RE	1981/January	NP400(F)	1981/June	NP400	1981/April	40	Dry TPD 2R1E Desk Top
NP201	1981/January	NP210	1981/October	NP210	1982/February	21	Dry TPD Desk Top
NP8500Super	1981/October	Not sold		NP8500 Super	1982/April	135	Dry Image Retention 2R Floor
NP120RE	1982/January	NP125	1982/July	NP125	1982/April	12	Dry TPD RE Desk Top
NP300R	1982/January	NP300F	1982/April	NP300	1981/December	30	Dry TPD R1 Desk Top
PC10	1982/October	PC10	1983/January	PC10	1983/January	8	Dry TPD PC Desk Top
[illegible]20	1982/October	PC20	1983/January	PC20	1983/January	8	Dry TPD PC Desk Top
[illegible]00RE*	1983/March	NP500	1983/June	NP500	1983/April	50	Dry TPD 2R1E Desk Top AE
NP270RE*	1983/May	NP270	Not Yet	NP270	Not Yet	27	Dry TPD 2R1E Desk Top AE

Source: Casewriter's interviews

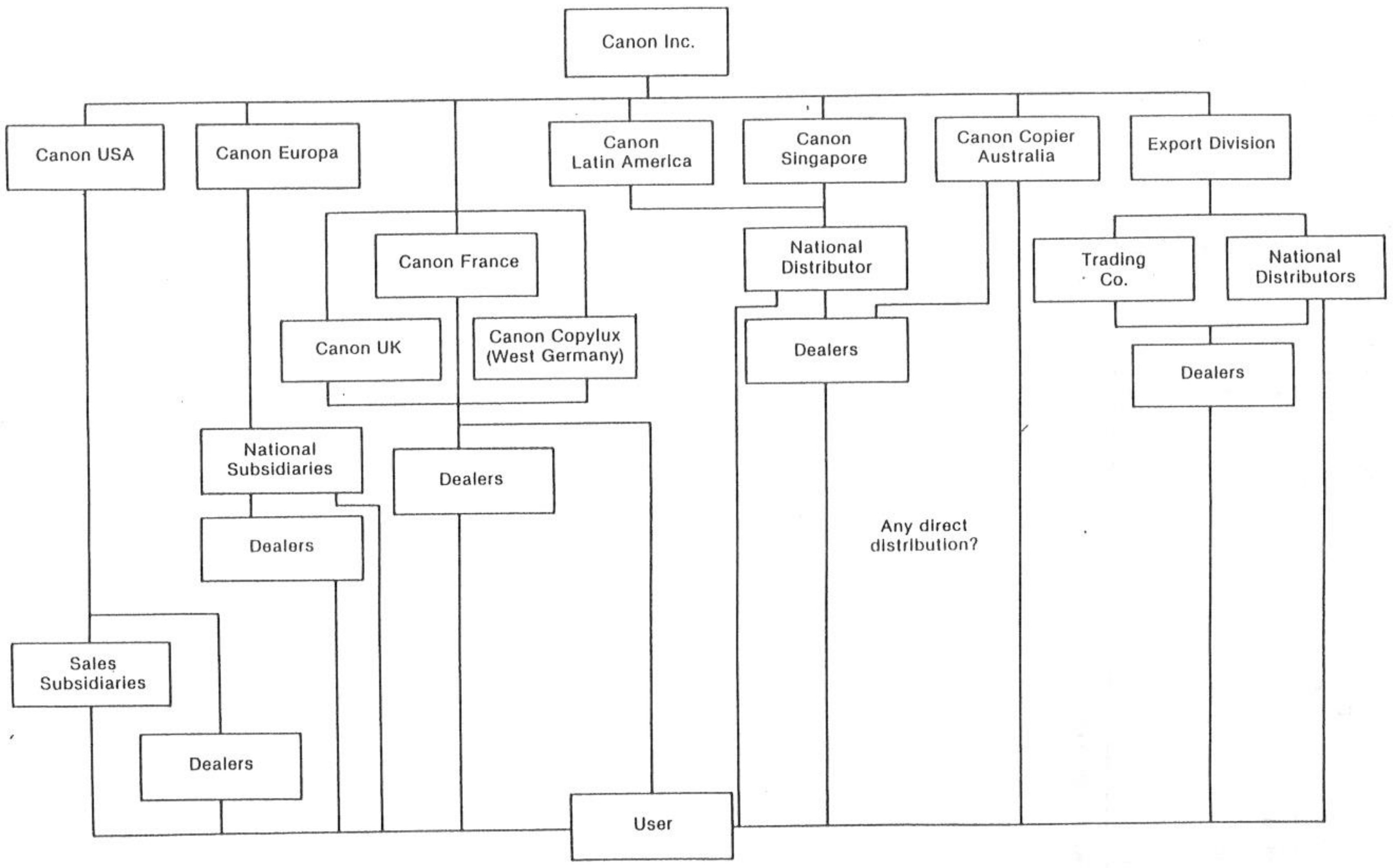
Note: R = Reduction
E = Enlargement
2R = Two-mode Reduction
TPD = Toner Projection Development
AE = Auto Exposure
* = Models produced in 1983

Exhibit 2 Canon PPC Distribution System in Japan



Source: Company records

Exhibit 3 Canon PPC Distribution System in Overseas Markets



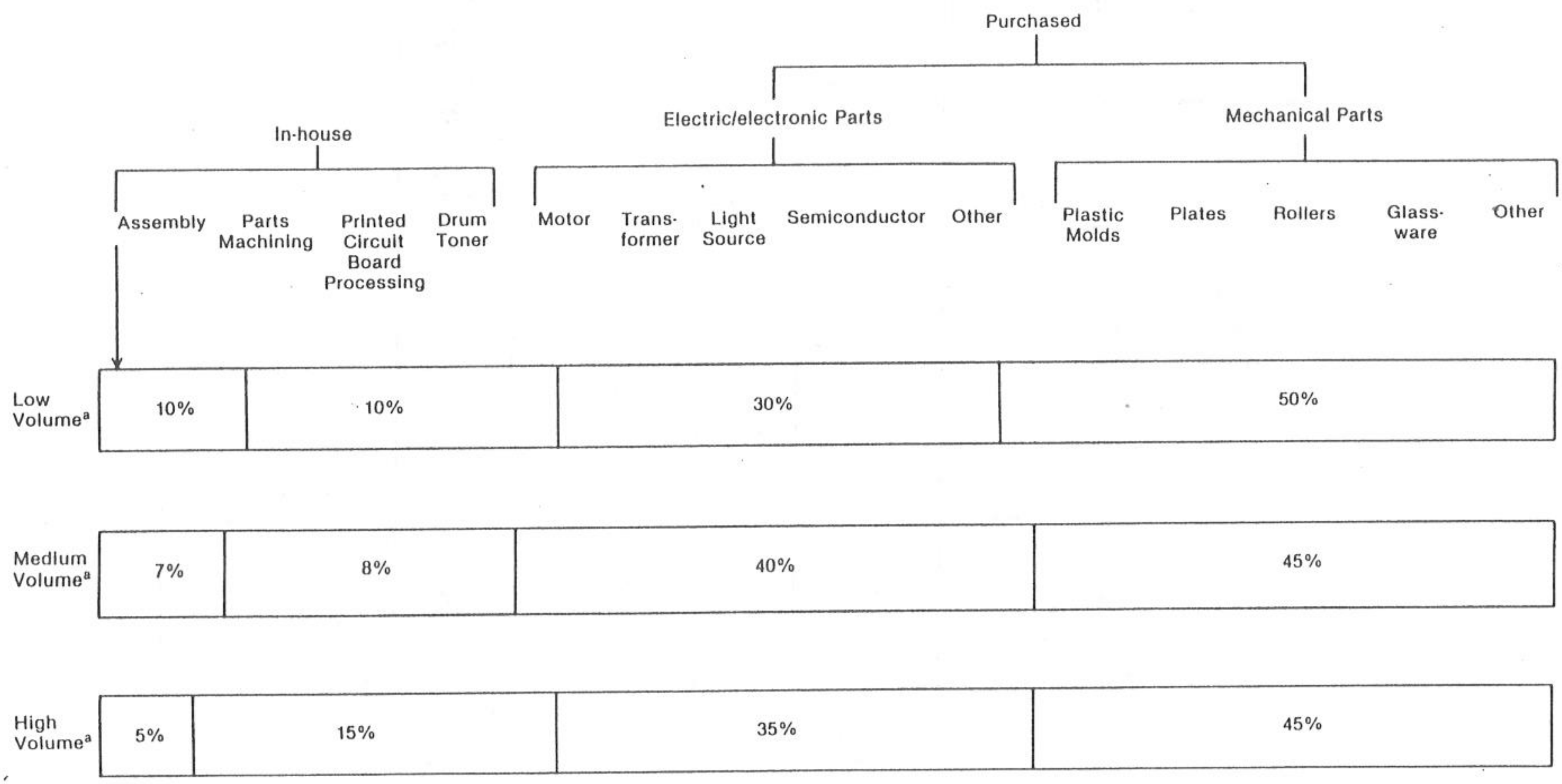
Source: Company interviews

Exhibit 4 Canon PPC Distribution System in European Countries

Country	*Direct Sales*	*NP Dealers*	*PC Dealers*	*Dealer Sales (%) (based on revenue)*
United Kingdom	X	X	X	80%
France	X	X	X	75
West Germany	X	X	X	90
Italy	–	X	X	100
Spain	X	X	X	65
Sweden	X	X	X	50
Switzerland	X	–	X	10% (PC only)

Source: Casewriter's estimates

Exhibit 5 Canon's Manufacturing Cost Breakdown for Three Models (%)



Source: Casewriter's estimates

Note: *Glassware* includes lenses and mirrors; *other* in mechanical parts includes gears and filters.

a. Figures are % of total manufacturing cost, including depreciation and overhead.

Exhibit 7 Canon Inc. Organization Chart

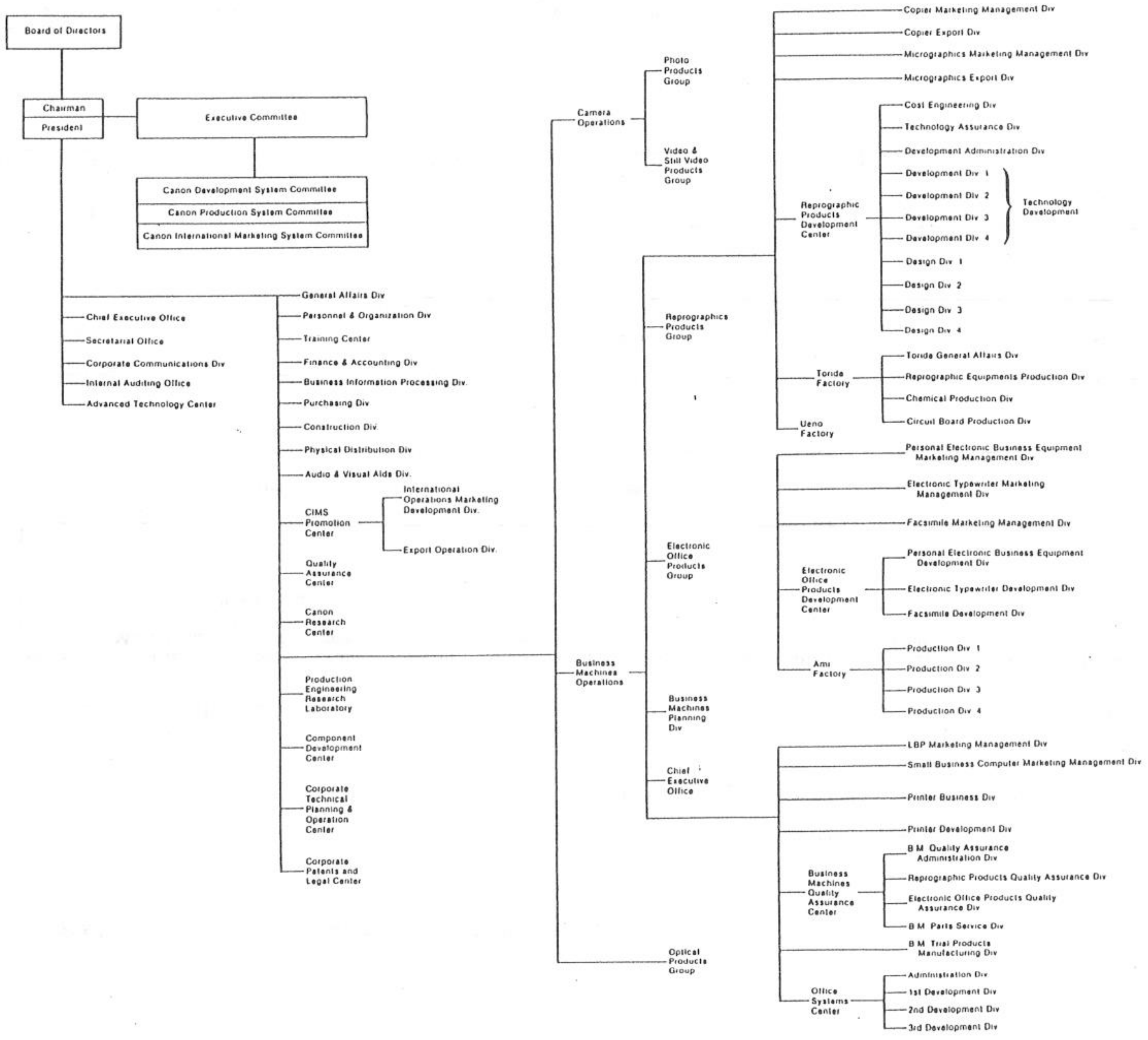
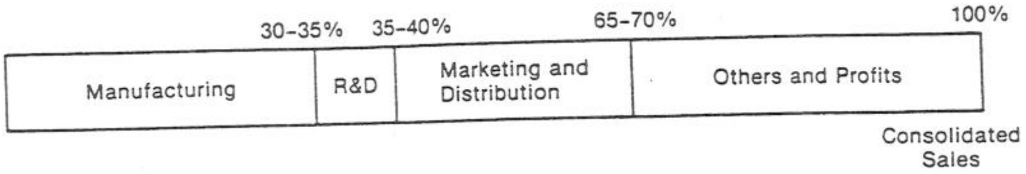


Exhibit 6 Breakdown of Consolidated Sales (%)



Source: Casewriter's estimates

Harvard Business School 9-387-108

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Coca-Cola Versus Pepsi-Cola (A)

Constance Lynn Irwin prepared this case under the supervision of Professor Andrall E. Pearson as the basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation.

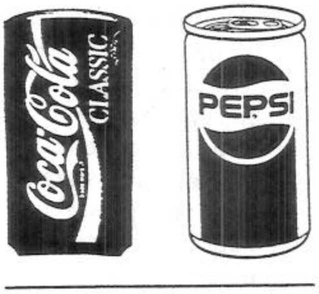
Coca-Cola and Pepsi-Cola had been competing for 93 years in 1982, and the rivalry had intensified since the early 1950s. By the mid-1970s, business journalists had labeled this competition "The Cola Wars." The launching of the Pepsi Challenge in 1977 propelled the wars into the 1980s, considerably altering the landscape of the soft-drink industry.

History of Soft-Drink Concentrate Producers

Soft drinks had existed since the late 1800s, when many American druggists concocted blends of fruit syrups and carbonated soda water that they sold at their soda fountains. During the 1880s, the formulas for Coca-Cola, Pepsi-Cola, and Dr Pepper were developed in this way in the southern United States.

Coca-Cola Company: History and Growth

In 1886, Dr. John Pemberton, a pharmacist in Atlanta, Georgia, formulated Coca-Cola. The drink was sold as a refreshing elixir at the fountain counter of Jacobs' Pharmacy, of which Pemberton was part owner. Eventually, Asa Candler became sole owner of the pharmacy and the rights to the soft drink. Candler sold the Coca-Cola syrup to other pharmacies, established a sales force, and advertised the drink on signs placed in train stations and town squares. The advertising budget reached $100,000 in 1901. Candler granted the first bottling franchise for the drink in 1899 for $1, believing that the drink's future rested with fountain sales.



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Note: This case draws from "Coca-Cola Versus Pepsi-Cola," HBS No. 9-386-059, prepared by Edward J. Hoff under the supervision of Professor Michael E. Porter.

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Coca-Cola's franchise bottler network grew quickly, and a standard 6½-ounce "skirt" bottle was designed in 1916 to be used by all franchises. This bottle eventually became one of the best-known images in the world. In 1920, Justice Oliver Wendell Holmes of the U.S. Supreme Court ruled that the nickname "Coke" could mean only Coca-Cola, because "it means a single thing coming from a single source, and is well known to the community. Coca-Cola probably means to most persons the plaintiff's familiar product to be had everywhere."

In 1919, Ernest Woodruff purchased the Coca-Cola Company from Candler's heirs for $25 million. In 1923, his son, Robert W. Woodruff, who became the dominant figure in Coke's history, was made CEO. Woodruff began working with the company's franchised bottlers to make Coke available everywhere, any time a consumer might want it. Woodruff tried to motivate the bottlers to place the beverage "in arm's reach of desire," arguing that if Coke were not conveniently available when the consumer was thirsty, the sale was lost forever. In 1929, Coca-Cola and its bottlers offered an open-top cooler for bottled Coke to storekeepers and gasoline station operators at extremely low prices. In 1937, the company introduced the first coin vending machine. Woodruff also initiated "lifestyle" advertising for Coca-Cola, which emphasized the product's role in a consumer's life rather than its product attributes. Coke's famous motto during the 1920s and 1930s was "The Pause That Refreshes." The company owned its original bottling operations around Atlanta and bought back a few franchises that were underperforming.

Woodruff also began developing Coke's international business, principally through its export company. The international division was led by James A. Farley, who later became a close aide to President Franklin Roosevelt. The Coca-Cola Company was viewed as closely connected to the Roosevelt administration.

Woodruff's most memorable action may have been his decision, made at the request of General Dwight Eisenhower at the beginning of World War II, to see, as Woodruff said, "that every man in uniform gets a bottle of Coca-Cola for 5¢ wherever he is and whatever it costs." Coca-Cola bottling plants followed the march of American troops around the world. This action gave Coke the dominant market share in most European and Asian countries. Woodruff remained on the board of directors and was influential in strategic decisions through 1982.

In 1954, Coke sales declined by 3% and profits by 8%, the first decline since before World War II. In 1955, Coke made the first change in its bottle since 1916, increasing it to 12 ounces. Later in the 1950s, Coke introduced larger bottle sizes to be sold through food stores.

The company also changed its advertising motto to "Be Really Refreshed." In 1960, Coke again changed its advertising theme to "No Wonder Coke Refreshes Best." Coca-Cola executives never voiced the name Pepsi-Cola in meetings with Coca-Cola bottlers but discussed only the growth of Coke.

PepsiCo, Inc.: History and Growth

Caleb Bradham, a pharmacist in New Bern, North Carolina, invented Pepsi-Cola in 1893. Pepsi followed a pattern similar to Coke's of expansion through franchised bottlers. Its growth in the early 1900s was not nearly as significant, however, and the company verged on bankruptcy several times. Pepsi designed a standard 12-ounce bottle, which its bottlers sold at a retail price of 10¢ compared with Coca-Cola's 5¢ for its 6½-ounce unit. In 1933, Pepsi lowered the price to 5¢, and in 1939, it launched its radio advertising jingle, "Twice As Much For a Nickel, Too. Pepsi-Cola is the One For You." In 1940, the radio industry rated that jingle as the second-best-known song in America after the "Star Spangled Banner."

In the years immediately following World War II, Coke outsold its closest rival, Pepsi, by 10 to 1 and held 70% of the cola segment of the market. Hundreds of small regional soft-drink producers continued to market a wide assortment of flavors.

In 1950, Alfred Steele became Pepsi's CEO. A former Coca-Cola marketing executive, he had apparently irritated Woodruff with his style. Pepsi was nearly bankrupt, having lost, during the 1940s, much of the market position it had gained in the 1930s. Steele later stated, "When I arrived at Pepsi, the vice presidents figured I had come to liquidate the company."[1]

Steele made "Beat Coke" his managerial theme and claimed that he honestly saw the day when Pepsi would outsell Coke. Pepsi introduced several new bottle sizes, including the

1. J. C. Louis and Harvey Z. Yazijian, *The Cola Wars* (New York: Everest House, 1980).

first 24-ounce bottle for family consumption. Pepsi executives focused Pepsi bottlers' efforts on take-home sales through the supermarkets that sprang up in the growing suburbs. New advertising campaigns were developed. In 1955, Steele married the actress Joan Crawford, who then began touring as guest speaker at regional Pepsi bottler meetings. Pepsi's revenues increased over 300% between 1950 and 1958.

Other Competitors: History and Growth

Dr Pepper was formulated by a fountain clerk in Waco, Texas, in 1885. A combination of fruit syrups gave it a unique flavor. The soft drink, also distributed through a network of franchised bottlers, became popular in the southwestern United States.

In 1962, a U.S. court ruled that Dr Pepper was not a cola: therefore, Coca-Cola or PepsiCo bottlers could carry Dr Pepper. Dr Pepper moved aggressively to expand from its base in the Southwest by signing up Coca-Cola or PepsiCo bottlers. By the mid-1970s, Dr Pepper had nationwide distribution, and sales grew from $17 million in 1962 to $152 million in 1976. Dr Pepper provided excellent support to its bottlers. In 1972, Coca-Cola introduced Mr. Pibb, a drink that tasted similar to Dr Pepper and tested it in Waco, Texas.

The Royal Crown Cola Company (which was strongest in the Southeast, Midwest, and in southern California) was considered by some industry analysts to be the most innovative soft-drink company. It introduced diet cola in 1962 and decaffeinated diet cola in 1980.

7UP appeared in 1929, establishing itself primarily as a popular drink and good mixer. It eventually took over the number three soft-drink position, increasing its national market share through its memorable "Uncola" advertising campaign begun in 1968. This campaign widened 7UP's appeal as more than just a mixer or a cure for minor ailments. About 50% of 7UP was sold through Coca-Cola, PepsiCo, and Royal Crown bottlers. The remainder was sold through franchised operations not carrying these three colas, as well as some company-owned bottling operations. During the 1970s, increased competition seriously affected Seven-Up's franchised bottling operations, and by 1978, Seven-Up's market share was declining. That year, Philip Morris acquired Seven-Up from the descendants of its original founders for $520 million.

The Sara Lee Corporation bought Shasta Beverages in 1960. The Shasta Division sold soft drinks directly to retail stores that operated their own warehouse facilities. Shasta produced 20 standard flavors, both diet and conventional formulations, primarily in cans, but by the 1980s one-liter and two-liter bottles were added. A 300-person sales force worked with large chain store personnel, assisting them with product display, pricing, and promotion. The company often gave discounts off list price to chains. Over 80% of Shasta's business was to food stores; the company did not attempt to sell to the fountain or to the single-service cold-case market. Shasta did not impose geographic restrictions on its wholesale purchasers, who could resell Shasta products anywhere.

Coke's Positioning in the 1960s and 1970s

In the 1960s, Coca-Cola continued to expand the distribution and availability of Coke in the United States and internationally. In 1960, Coca-Cola purchased the Minute Maid orange juice company, its first diversification effort. In the 1960s, new products, such as lemon-lime Sprite and diet Tab and Fresca, were introduced. Coca-Cola also began, in 1961, to offer its soft drinks in cans as well as bottles. The company policy would not extend the Coca-Cola or Coke name to any other products. Industry observers often referred to Coca-Cola as "Mother Coke."

Coke's soft-drink introductions in the 1960s and 1970s were as follows:

	Regular		*Diet*
1961	Sprite	1963	Tab
1972	Mr. Pibb	1966	Fresca
1979	Mellow Yellow	1974	Diet Sprite

Throughout the 1960s and 1970s, Coca-Cola's unit sales and profits increased, although slower than Pepsi's. Advertising expenditures rose steadily, and Coke commercials in the United States portrayed a positive image of Coke as a part of American life. Coca-Cola executives maintained their policy of not mentioning Pepsi-Cola at bottlers' meetings. In 1976,

Coke and its bottlers began to offer periodic price promotions to the trade and to the end-consumers. That same year, Paul Austin, CEO of Coca-Cola, stated that U.S. soft-drink consumption had matured and that Coke's largest growth would come from the international market. International sales in 1980 accounted for 62% of Coca-Cola's soft-drink volume and 20% of PepsiCo's. In 1977, Coca-Cola acquired the Taylor Wine Company, a U.S. winery in the middle- and lower-priced segments.

Pepsi's Positioning in the 1960s and 1970s

In 1963, Donald Kendall became CEO of Pepsi-Cola. Kendall, a former Pepsi sales manager and later head of the international operation, attracted attention in 1959, when he convinced Vice President Richard Nixon to bring Soviet Premier Nikita Khrushchev by the Pepsi booth at the American Exhibition in Moscow. Under Kendall, Pepsi-Cola Company was renamed PepsiCo and diversified into several new lines of business, including snack foods (Frito-Lay) and restaurants (Pizza Hut and Taco Bell).

In 1964, Pepsi expanded its product line by introducing Diet Pepsi and Mountain Dew. Also in the 1960s, Pepsi launched its "Pepsi Generation" advertising theme, which portrayed the product as the choice of the young and young at heart. Pepsi bottlers were praised at meetings as "veterans in the war against Coca-Cola" who "invaded" Coke markets with new "sales weapons."[2]

In the 1960s and 1970s, PepsiCo improved the management of its store-door delivery operations. (Both Pepsi beverages and Frito-Lay snacks were distributed by this method, although PepsiCo owned all the delivery operations for Frito-Lay.) In 1970 and 1971, PepsiCo recruited several experienced consumer marketing executives from outside the company. Subsequently, Pepsi became a much more aggressive, focused competitor. Stringent standards were set, whereby Pepsi and Frito-Lay store-door salespeople were expected to gain, keep, and maintain in good form the retail shelf space for PepsiCo products. Specifically, salespeople were to (1) secure a specific shelf-space arrangement for Pepsi products, and (2) strive to maintain a permanent secondary site (for example, an end-aisle display) in every supermarket. Industry executives had tended to accept the disarray because of high product turnover in both the soft-drink and snack-food sections of food stores. By the 1980s, however, Pepsi and its competitors had improved their standards, and these sections were considered to be the best-maintained and best-merchandised areas of most food stores.

The price that Pepsi charged its bottlers for concentrate was approximately 20% below the price that Coke charged throughout the 1950s and 1960s. Pepsi's franchise agreement permitted renegotiation of the price, and Pepsi raised the price on a par with Coke in the early 1970s. Pepsi secured the price increases without fierce opposition because it promised to use the extra margin to increase advertising and promotion for Pepsi brands. In 1975, Pepsi, for the first time, gained the market-share lead in food stores from Coke, according to Nielsen audits.

Pepsi's soft-drink introductions in the 1960s and 1970s were as follows:

	Regular		*Diet*
1964	Mountain Dew	1964	Diet Pepsi
		1977	Pepsi Light

The Pepsi Challenge

In Dallas, Texas, Pepsi was the third-largest-selling soft drink in 1974, behind Coke and Dr Pepper. The sales manager for that district had seen the Pepsi market research, which indicated that the majority of consumers in blind taste tests preferred Pepsi over Coke by approximiately 58% to 42%. The Pepsi manager initiated in-store "Challenge Booths" to persuade consumers to take the blind taste test. Pepsi immediately moved up in share and eventually became the number-two brand.

In 1975, Victor Bonomo, president of Pepsi U.S.A., decided to employ the Pepsi Challenge in other markets where Pepsi was weak. The challenge was extended to all company-owned bottlers, thus accounting for over 20% of Pepsi's sales, including the New York, Los Angeles, and Detroit markets. Advertising, store displays, the message that the bottlers' salespeople conveyed to the trade, and in-store Challenge Booths all highlighted the Challenge.

2. Pat Watters, *Coca-Cola: An Illustrated History* (New York: Doubleday, 1978).

Pepsi finally launched the Challenge nationwide in 1977. By 1980, the regular Pepsi brand had gained an additional 1.3% share of market lead over the Coca-Cola brand in food stores.

Pepsi worked to exploit the success of the Challenge by motivating and improving the performance of its bottlers. John Sculley, who succeeded Bonomo as president of Pepsi U.S.A. in 1980, urged Pepsi bottlers to expand sales through vending and fountain outlets. Sculley was quoted in 1980 as saying, "I want our bottlers to defend their competitive position in food stores but also to go for the competitors' jugular by attacking its high-margin vending business." Sculley also raised the price of Diet Pepsi's concentrate and used the greater margin to increase advertising in the growing diet segment.

Coke's Response

Coca-Cola responded to the broadened Pepsi Challenge by initiating major price discounts in selected markets where (1) Pepsi was weak, (2) the Pepsi bottler was an independent franchisee, and (3) the Coke bottler was company owned. Coke only selectively used price as a competitive weapon during the remainder of the 1970s. The cost of price promotions continued to be split approximately two-thirds to the bottler and one-third to the concentrate producer. Advertising expenditures for both Coke and Pepsi, however, increased significantly during the late 1970s.

In 1980, Roberto Goizueta became CEO for Coca-Cola. As one of his first acts, Goizueta issued a 1,200-word strategy statement that called for dramatic changes at Coke. Coke would look for growth in the U.S. soft-drink market. Price discounting would be used, when necessary, to retain Coke's dominant position in that market.

As a result, price discounting further intensified in 1980 as Coke and its bottlers increased discounts. By the end of 1980, approximately 50% of Coke and Pepsi in the food stores was sold at discount. In 1981, Nielsen audits indicated that Coke cost an average of 15¢ less per 192-ounce case than Pepsi.

Coke also sought to amend its franchise agreement by permitting the price of Coke concentrate to be increased. It had been frozen by the agreements for 60 years despite inflation. Coke used the higher gross margins for advertising and promotions. In exchange, Coke agreed to sell concentrate rather than syrup (including sweetener) to some of its largest bottlers. The company would use the Coca-Cola brand name as competitive "equity" and would no longer treat it as sacrosanct.

In 1980, Coke began to influence the ownership and management of its franchised bottlers. Although Coke remained committed to independent bottlers, the company replaced bottlers in key markets where they were not deemed sufficiently aggressive, sometimes taking an equity position in the new ownership. Between 1980 and 1984, franchises that represented 50% of Coke's volume changed ownership. The president of Coca-Cola U.S.A. stated that the Coca-Cola Company had had some role in each purchase. In several instances, it even offered to raise capital for certain potential buyers.

A dramatic example of this policy was Coke's decision in 1982 to make Coca-Cola Bottling of New York a private corporation. Coca-Cola Bottling of New York was a $700 million corporation, publicly traded on the New York Stock Exchange, that had diversified into several smaller operations besides bottling. It had an average ROE of 10% in the five years before 1982. The Coca-Cola Company (of Atlanta) acquired 35% of Coca-Cola of New York and arranged for private investors (including Bill Cosby, the entertainer, who was then the advertising spokesperson for the Coca-Cola brand) to acquire the other 65%. Charles Millard, CEO of Coca-Cola of New York, later said, "We became a born-again bottler, as we focused again on our mainline business of selling soft drinks."[3]

Coke also changed its advertising theme in 1982. Goizueta stated, "With our new slogan, 'Coke Is It,' we're saying we're number one and not ashamed of it. Our former slogan, 'Have a Coke and a Smile,' was wonderful, but we were in a fight, and our slogan was a ballad. The momentum has now shifted from Purchase, New York [headquarters of PepsiCo], to Atlanta."[4]

Coke also modified its corporate strategy in 1982. Columbia Pictures was acquired that year, and Goizueta stated that Coca-Cola would become a "beverage and entertainment enterprise, strong in both businesses."

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3. *Beverage World*, July 1984.

4. *Industry Week*, November 1982.

Industry Reactions

In 1980, surveys indicated that approximately 15% to 20% of American consumers were seriously concerned about caffeine consumption. In addition, the diet segment of the soft-drink market had been growing steadily, constituting 13% of the market in 1980. As a result, Royal Crown announced RC/100, a diet, caffeine-free cola in 1980. In 1981, Seven-Up exploited the fact that its product had never contained caffeine. Its advertising theme became "Never Had It, Never Will." It also ran ads featuring other soft-drink brands, including Pepsi, that contained caffeine and implied that caffeine was bad for the consumer. Pepsi's management wrote an angry letter to its franchise bottlers that marketed both Pepsi and 7UP and demanded that they not run the ads that disparaged Pepsi. Some bottlers complied, some did not. Seven-Up attempted to carry this theme further by introducing Like in March 1982. Like was a caffeine-free regular cola. In response to a suit initiated by Coca-Cola, a U.S. court determined that Like was, in fact, a cola; therefore, bottlers of Coca-Cola, Pepsi-Cola, and RC Cola could not market it.

Price discounting further intensified in 1982. Coke led this trend, particularly in the early months of the year. Dr Pepper, in its annual report for 1982, attributed lower earnings directly to the effect of competitive discounting.

Exhibit 1 Financial Data for Coca-Cola Co. and PepsiCo, Inc., 1977–1982 ($ in millions)

	1977	1978	1979	1980	1981	1982
Coca-Cola Co.[a]						
U.S. soft-drink sales	$1,178	$1,307	$1,544	$1,928	$2,022	$2,281
U.S. operating income	201	191	184	204	216	250
U.S. % operating income	17%	15%	12%	11%	11%	11%
PepsiCo, Inc.						
U.S. soft-drink sales	$876	$1,000	$1,175	$1,403	$1,667	$1,867
U.S. operating income	136	159	163	177	198	221
U.S. % operating income	16%	16%	14%	13%	12%	12%

a. Coca-Cola's U.S. figures represent the combined financial data of the United States and Puerto Rico for all years, based upon industry data available. (Separate U.S. soft-drink sales and operating income are unavailable.)

Exhibit 2 U.S. Consumption of Soft Drinks for Selected Years

	Market Shares (%) by Case Volume			
	1977	1978	1980	1982
Coca-Cola Co.				
Coca-Cola	26.3%	25.8%	25.3%	24.6%
Diet Coke	–	–	–	0.3
Sprite	3.0	3.0	3.0	2.9
Tab	2.8	2.9	3.3	4.0
Others	4.2	4.0	4.3	3.8
Total	36.3	35.7	35.9	35.6
PepsiCo, Inc.				
Pepsi-Cola	20.0	20.4	20.4	20.3
Diet Pepsi	2.4	2.7	3.0	3.3
Mountain Dew	2.2	2.7	3.2	3.2
Others	1.4	1.2	1.1	1.3
Total	26.0	27.0	27.7	28.1
Seven-Up	7.3	7.0	6.3	6.7
Dr Pepper	5.6	6.0	6.0	5.2
Royal Crown Cos.	4.6	4.3	4.7	3.9
Other companies	20.2%	20.0%	19.4%	20.5%

Source: John C. Maxwell, Jr., and *Beverage Industry*.

7

Bitter Competition: The Holland Sweetener Company versus NutraSweet (A)

In late 1986, the Holland Sweetener Company (HSC), based in Maastricht, the Netherlands, was preparing to enter the European and Canadian aspartame markets. Aspartame, a low-calorie, high-intensity sweetener, had been discovered in 1965 by G.D. Searle & Co., a U.S. pharmaceuticals company. After having secured a number of patents on its discovery, Searle had gone on to develop markets for aspartame as a food and beverage additive. By 1986, NutraSweet, the operating entity set up by Searle to build the aspartame business, had reached sales of $711 million. Now, NutraSweet's patents in the European and Canadian markets were due to expire as of 1987, although the U.S. market would remain protected until December 1992.

Winfried Vermijs, president of HSC, reviewed his company's strategy for competing in the aspartame business. Price and volume forecasts had been prepared for the European and Canadian aspartame markets. On price, two scenarios were being entertained: "normal competition" and "price war." Vermijs wondered which scenario was the more likely.

Aspartame

High-intensity sweeteners had a long history. In Roman times, grape juice was boiled down in lead pans to produce sapa, a sweet compound used for everything from a food additive to an oral contraceptive. Presaging concerns over the safety of modern high-intensity sweeteners, use of sapa unfortunately led to neurological damage or even death. Discovered in 1879, the oldest high-intensity sweetener still in use was saccharin, a petroleum derivative about 300 times as sweet as sugar (sucrose) of equal weight. In the 1960s, Abbott Laboratories developed cyclamate (30 times as sweet as sugar) but, following studies suggesting a link to cancer, the Food and Drug Administration (FDA) banned cyclamate in 1970. In 1977, the FDA tried to ban saccharin as well, but the resulting public outcry caused Congress to intervene and declare a moratorium. Manufacturers of saccharin were, however, required to place notices on labels, warning consumers of the possible increased

Professor Adam M. Brandenbuger prepared this case as the basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation. The case draws on a report by Peter Wetenhall (MBA '92). Assistance from Research Associate Maryellen Costello, Rena Henderson, and Research Assistant Julia Kou is gratefully acknowledged.

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cancer risk. Apart from the safety issue, many people found saccharin to have a slightly bitter, metallic, aftertaste.

Aspartame was a white powder consisting of L-aspartic acid and L-phenylalanine, two naturally occurring optically active amino acids, together with a small amount of methanol. It had the same caloric content as sugar of equal weight, but was 180 times as sweet. Unlike sugar, aspartame did not promote tooth decay. The main drawbacks of aspartame were that it became unstable when exposed to high temperatures (as in baking) and that it had a limited shelf life in soft drinks.

Aspartame had been discovered by accident. In 1965, James Schlatter, a research scientist at G.D. Searle & Co., a pharmaceuticals company based in Skokie, Illinois, was working on a project to develop an anti-ulcer drug. While experimenting with L-aspartic acid and L-phenylalanine, he happened to lick his finger to pick up a piece of paper and noticed a sweet taste. He later coined the term "aspartame" for the combination of amino acids.

NutraSweet[1]

G.D. Searle & Co. was formed in 1908, although the company's roots could be traced back to 1888. From its upper Midwest beginnings, Searle grew to become a *Fortune 500* pharmaceuticals company in 1968. Following its serendipitous discovery of aspartame, the company had an opportunity to strike out in a new direction. Searle secured two key patents on aspartame. The "use" patent, obtained in 1970, covered any use of aspartame as a sweetening ingredient. The "blend" patent, obtained in 1973, covered combinations of aspartame and saccharin. Approval from the FDA for the use of aspartame as a food additive was sought the same year.[2] After giving a green light to dry use of aspartame (tabletop sweeteners and powdered drinks) in 1974, the FDA withdrew its approval shortly afterwards, pending the results of further tests. Not until July 1981 did the FDA give the final go-ahead for dry use of aspartame. Wet-use approval (soft drinks) came in July 1983.

In the wake of the regulatory delays, Searle sought extensions of its two patents. It was successful in getting the use patent extended—to 1987 in Europe, to December 14, 1992 in the United States, and to April 1993 in Australia. An attempt to extend the Canadian use patent, which was due to expire in 1987, was unsuccessful. The blend patent was extended to November 4, 1996 in the United States.

Manufacturing

To manufacture aspartame on a commercial scale, Searle turned to Ajinomoto, a major Japanese chemicals and food company. Ajinomoto was a leading player in amino acid research and production, dominating the monosodium glutamate (MSG) market. (For financial data on Ajinomoto, refer to **Exhibit 3.**) Ajinomoto supplied a chemical coupling process for manufacturing

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[1]Some material in this section is taken from "The NutraSweet Company: Technology to Tailormake Foods," Harvard Business School Case Services (589-050), 1988, and *Sweet Success: How NutraSweet Created a Billion Dollar Business*, by Joseph McCann, Homewood: Irwin, 1990.

[2]Under FDA rules, an applicant had to establish the "added value" of a new product. However, only the efficacy of a new product, and not its cost, entered into the added value assessment. Thus the criterion for approval of a high-intensity sweetener was that it be provably superior to existing sweeteners as an aid to dieting.

aspartame, as well as the L-phenylalanine input. (The other input, L-aspartic acid, was widely used in pharmaceutical applications and could be obtained from a number of sources.) Searle agreed to pay Ajinomoto royalties for access to the process technology, and the two parties further agreed to share information on subsequent process improvements. A cross-licensing deal was also struck under which Ajinomoto was given exclusive access to the Japanese aspartame market—where it went on to sell aspartame under the brand names *Pal Sweet* and *Pal Sweet Diet*. Searle retained sole rights to the North American market.

It took two to three years to bring aspartame production up to speed. (Once operational, however, a facility had to be run at or near to design capacity. Interruptions to production were prohibitively expensive due to significant mothballing and debugging costs.) Minimum efficient scale was of the order of 2,000 tonnes annual capacity, while plant construction costs exceeded $100 million. With shipping costs for aspartame around 15-20 cents per lb, NutraSweet and Ajinomoto concentrated production in a limited number of facilities (see **Table 1**).

Table 1 NutraSweet and Ajinomoto Production Facilities

Company	Facility	Annual capacity (tonnes)
NutraSweet	University Park, IL	2,000
	Augusta, GA	3,000
	Harbor Beach, MI	n/a
Ajinomoto	Tokyo, Japan	2,000

Source: *Chemical Marketing Reporter* and *Financial Times* (various issues), casewriter estimates

The NutraSweet-Ajinomoto method of manufacturing aspartame was covered by process patents extending through the late 1990s. With a continuing program of process improvement and capital investment in place, NutraSweet and Ajinomoto aimed to increase the efficiency of their manufacturing operations over time. By 1992, NutraSweet would be proclaiming that it had cut its manufacturing costs by 70% over the previous decade.[3]

Market Development

Having spent nearly $80 million in start-up costs (excluding investments in plant), Searle launched its first aspartame product, the tabletop sweetener *Equal*, in October 1981. At that time, the U.S. tabletop sweetener market totalled about $110 million. It was dominated by one brand, *Sweet 'N Low*, a saccharin-based product made by the Cumberland Packing Company of Brooklyn, New York. Although it was three times more expensive than *Sweet 'N Low*, Searle's *Equal* was an immediate success in the marketplace.

In December 1982, The NutraSweet Group was established as a separate operating division of Searle.[4] Forty-year-old Robert Shapiro, Searle's general counsel, was brought in as president. Educated at Harvard and Columbia Law School, Shapiro had served on several government advisory committees and had then spent time in the private sector before joining Searle in 1979.

[3]Monsanto Company 1992 Annual Report, p. 15.

[4]From now on the term "NutraSweet" will denote this operating entity. The italicized *NutraSweet* will be used to refer to branded aspartame.

Following FDA approval for wet use of aspartame, Shapiro set in motion the now-famous "branded ingredient" strategy. Aspartame, under the brand name *NutraSweet*, was made available to any interested food or beverage manufacturer. This was backed up with extensive advertising (estimated at $30 million annually) of the brand name directly to end-users, and by cooperative advertising with manufacturers. The company gave discounts of up to 40% off the list price of aspartame to manufacturers who agreed to use 100% aspartame as a sweetener (rather than blends of aspartame and saccharin, say), to make NutraSweet their exclusive worldwide supplier, and to display the *NutraSweet* trademark and distinctive red-and-white "swirl" logo on their products and in their own advertising. By 1986, the company was claiming that 98% of American consumers recognized its logo.[5]

The soft drink market was NutraSweet's primary focus in 1983. The U.S. soft drink industry was dominated by two players, Coca-Cola and Pepsi-Cola, which, between them, accounted for something over 60% of shipments in an industry with annual sales of $26 billion at the retail level. The diet segment accounted for 20% of the U.S. soft drink market and was growing rapidly. To date, saccharin had been used to sweeten diet soft drinks.

NutraSweet sold aspartame directly to major buyers such as Coke and Pepsi via secret, negotiated, multi-year contracts. In 1983, the contracted price was around $85-90 per lb. Although this represented a substantial premium over saccharin (which cost around $3 per lb) and even sugar (about 25 cents per lb), aspartame replaced virtually all the U.S. soft drink use of saccharin within two years of its introduction. Pepsi, first to use 100% aspartame in its diet beverages, used its head start over Coke to promote Diet Pepsi against Diet Coke.

The 1980s saw intense activity by Coke and Pepsi in the U.S. soft drink market. A memorable episode in the so-called Cola Wars was Coke's 1985 reformulation of its 99-year-old Coca-Cola brand, from which it beat a hasty retreat in the face of consumer resistance. Pepsi responded to the reformulation with commercials proclaiming: "For 87 years Coke and Pepsi have been eyeball to eyeball. It looks like they just blinked . . . ."[6]

Over time, NutraSweet expanded aspartame's range of applications to include use in powdered drink mixes, frozen desserts, chewing gum, toppings, cereals, and over-the-counter pharmaceuticals, among other products. However, diet soft drinks continued to be the principal use, accounting for about 80% of total sales of aspartame. The tabletop market accounted for another 15% of sales, other food and beverage products the remainder.

NutraSweet also looked to develop markets for aspartame outside the United States. Canada was an early target. In 1984, NutraSweet and Ajinomoto set up a 50:50 joint venture, NutraSweet AG, based in Zug, Switzerland, to market *NutraSweet* to European commercial buyers and the tabletop sweetener (under the name *Canderel*) to European consumers. As in the U.S., the soft drink industry was the primary focus of efforts to sell aspartame internationally, and Coke and Pepsi were again the major buyers. Unlike the situation in the United States, however, Coke enjoyed a strong lead over Pepsi in most overseas markets. In Europe, Coke was estimated to have a 50% market share and Pepsi a 10% share. In Asia, Coke's share of the soft drink market stood at 40%; Pepsi again held a 10% share. In Latin America, Coke held a 55% market share and Pepsi a 20% share.

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[5]Monsanto Company 1985 Annual Report, p. 19.

[6]For more information on this and other events in the soft drink industry, see "Cola Wars Continue: Coke vs. Pepsi in the 1990s," Harvard Business School Case Services (794-055), 1994.

Exhibit 1 depicts the growth of the worldwide aspartame market through 1986. In that year, worldwide aspartame prices were around $70 per lb.

Acquisition

In summer 1985, Searle was acquired by Monsanto Corporation for $2.8 billion. Monsanto, headquartered in St. Louis, Missouri, was a leading U.S. producer of agricultural products, plastics and specialty chemicals, performance materials (such as synthetic fibers), and industrial control equipment. (**Exhibit 4** summarizes financial data on Monsanto.) Curiously, the mission of the original Monsanto Chemical Works, formed in St. Louis in 1901, was to challenge the then German monopoly hold on the saccharin market. Now, with the purchase of Searle, NutraSweet became a wholly owned subsidiary of Monsanto.

Since the acquisition, Monsanto had been writing off the cost of the aspartame patents via a $173 million annual charge against NutraSweet's earnings. The amortization charge would end with the U.S. expiration of the use patent in 1992.

The Holland Sweetener Company

In April 1985, the Holland Sweetener Company (HSC) was formed in Maastricht, the Netherlands, as a joint venture between Tosoh Corporation and DSM to enter the aspartame market. Headquartered in Tokyo, Japan, Tosoh had begun business in 1935 as a producer of soda ash and caustic soda. The company had since grown to become a diversified manufacturer of basic chemicals, intermediates, and downstream products, as well as scientific instruments and ceramics. Based in Heerlen, the Netherlands, DSM was a chemicals group with interests in plastics, synthetic rubber, fine chemicals, fertilizers, resins, consumer products, and oil and natural gas exploration and development. The company had begun as "Dutch State Mines" around the turn of the century, but over time had been migrating into downstream businesses. Since 1986, DSM had been publicly traded, with the Dutch government retaining a one-third interest. **Exhibits 5** and **6** summarize financial data on Tosoh and DSM.

Tosoh brought to the hook-up with DSM a patented process for manufacturing aspartame that employed a natural catalyst to solve the problem of achieving a precise coupling between the aspartic acid and phenylalanine inputs. The Tosoh process was capable of using either L-phenylalanine or D,L-phenylalanine (a mixture of the D- and L-isomers) as base feedstock. (**Exhibit 2** sketches the process.) HSC claimed that its method of producing aspartame would be less costly and more flexible than NutraSweet's, although this was disputed. DSM's contribution to the joint venture was raw material supply and traditional chemical processes (courtesy of its Fine Chemicals Division), and knowledge of the European marketplace.

Heading up HSC was Winfried Vermijs, a 50-year-old chemical engineer who had been with DSM since 1961. Vermijs had begun his career working on process development in DSM pilot plants. After a stint as a plant manager in the 1970s, he had returned to research and development activities for several years before taking on general management responsibility as president of HSC.

In February 1986, HSC began work on a 500-tonne aspartame plant in Geleen, the Netherlands, with a view to challenging NutraSweet in Europe and Canada once NutraSweet's patents expired there in 1987. The company received a D.Fl. 35 million ($17 million) loan from the European Investment Bank towards the project.

In preliminary discussions with potential customers, HSC discovered that NutraSweet had signed Coke and Pepsi to exclusive, multi-year contracts. It decided to lodge a complaint with the European Commission, charging that the contracts were anti-competitive. Joining HSC in the complaint was the Irish company Angus Fine Chemicals.

New Sweeteners

In addition to aspartame, saccharin, and cyclamate, several other high-intensity sweeteners were on the market or in various stages of regulatory review.

Acesulfame-K had been discovered in 1967 and was now being sold in Europe. It was 200 times sweeter than sugar and was heat-stable, which gave it an advantage over aspartame in shelf-stable products and in baking. Acesulfame-K was manufactured by Hoechst, a major German chemicals company.

Sucralose, a heat-stable compound 500 times sweeter than sugar, was derived from sucrose by a patented chlorination process developed in 1976 by the British sugar company Tate & Lyle and researchers at Queen Elizabeth College in London. Johnson & Johnson, the U.S. consumer products company, had entered a licensing agreement with Tate & Lyle and, through its McNeil Specialty Products division, hoped to market sucralose in the United States and Japan under the brand name *Splenda*.

Alitame, a heat-stable product 2,000 times sweeter than sugar, was made by the U.S. pharmaceuticals company Pfizer. A petition for FDA approval was submitted in 1986.

There were also several naturally-derived high-intensity sweeteners. Stevioside, made from the leaves of the South American Stevia plant, was in demand in Japan. Thaumatin, genetically engineered to replicate proteins found in berries of certain West African plants, was being used as a sweetener in Japan, Brazil, and the U.K. Neither sweetener had yet been approved in the United States.

One trend expected to strengthen if a wider range of high-intensity sweeteners became available was blending. Researchers had found that combining sweeteners could have a synergistic effect: the blend was sweeter and might have a better taste profile for certain applications than either sweetener separately. U.S. health authorities also encouraged a multiple-sweetener approach on the grounds that it reduced the health risks from any one product.

Exhibit 1 Growth of Worldwide Aspartame Market

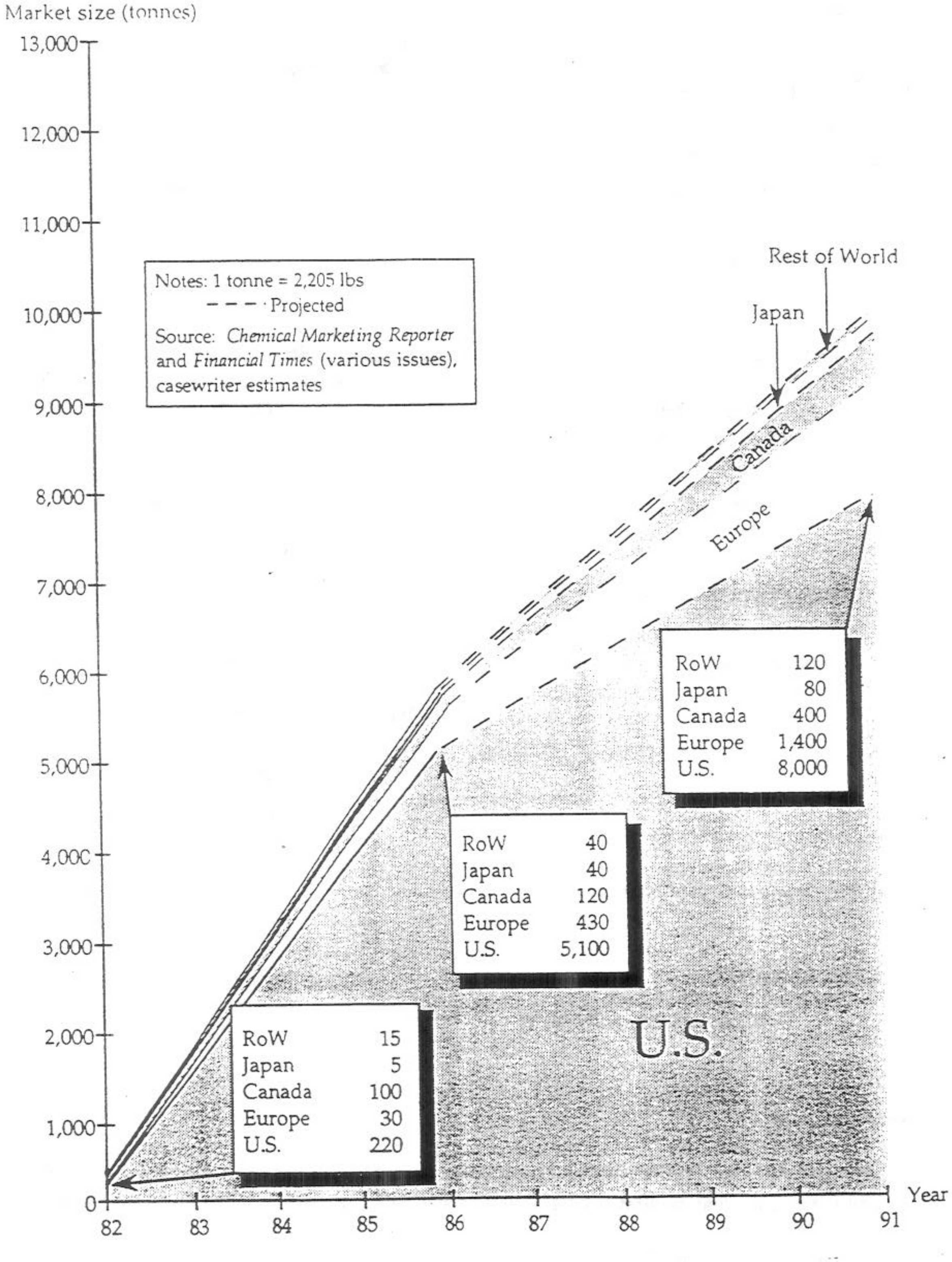
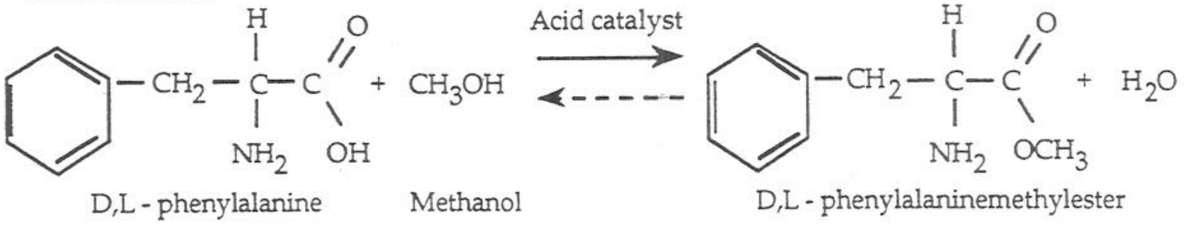
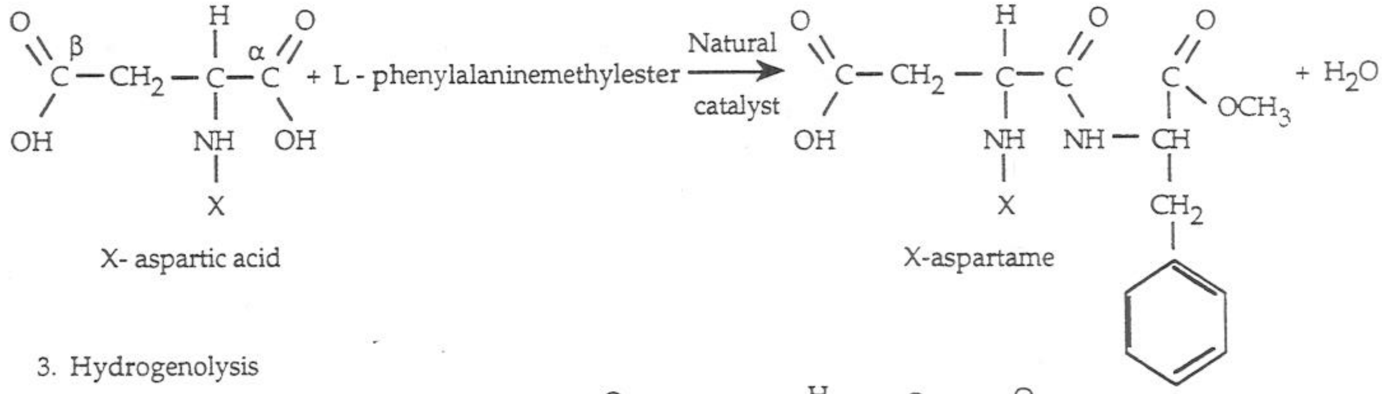


Exhibit 2 Main Steps in the HSC Process for Making Aspartame

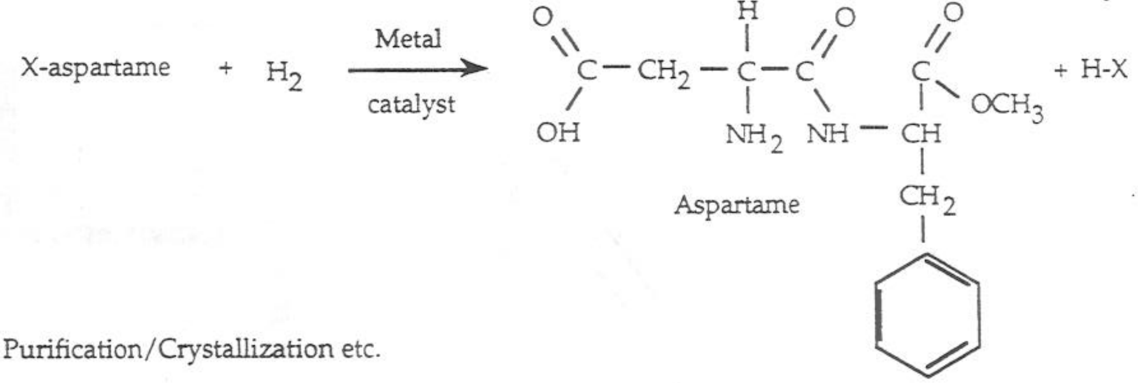
1. Esterification



2. Condensation



3. Hydrogenolysis



4. Purification/Crystallization etc.

5. Racemization

D- phenylalaninemethylester $\xrightarrow[10\text{ bar}]{170^{\circ}\text{C}}$ D,L - phenylalanine + CH_3OH

Notes:

(a) X=proprietary group

(b) The Nutrasweet-Ajinomoto chemical coupling process produces 70% to 80% α-aspartame and 20% to 30% β-aspartame. The α- and β-forms are then separated via selective crystallization, and the β-form split back down into raw materials.

Source: Holland Sweetener Company

Exhibit 3 Ajinomoto Co., Inc.: Financial Data

Financial Summary (¥ millions)

	1982	1983	1984	1985	1986
Net Sales	444,509	470,169	482,307	510,788	515,062
Cost of Goods Sold	335,128	356,498	359,880	378,877	387,737
SG&A	83,829	84,667	87,561	94,819	96,280
Operating Income	25,552	29,004	34,866	37,092	31,045
Interest Income (Expense)	(6,415)	(7,009)	(6,644)	(6,575)	(7,062)
Provision for Income Taxes	12,182	14,024	18,401	20,760	17,163
Other Income (Expense)	3,174	2,844	3,234	5,277	8,266
Net Income	10,129	10,815	13,055	15,034	15,086
Total Assets	368,050	380,545	395,337	438,240	492,193
Long-term Obligations	73,968	73,101	68,775	89,197	130,816
Shareholders' Equity	145,785	161,948	171,196	188,675	210,741
Current Assets	208,691	211,364	224,580	252,464	272,832
Current Liabilities	147,741	145,493	155,362	160,366	150,633

Sales by Business Segment (¥ billions)

	1982	1983	1984	1985	1986
Seasonings	136.6	137.1	128.7	133.5	137.7
Edible oils	86.5	87.1	90.3	93.2	86.3
Processed foods	147.9	153.1	160.0	166.6	177.2
Amino acids, pharmaceuticals, and specialty chemicals	45.0	59.4	67.2	78.3	75.5
Other products	28.5	33.5	36.2	39.2	38.4

Source: Ajinomoto Co., Inc. Annual Reports

Exhibit 4 Monsanto Corporation: Financial Data ($ millions)

Financial Summary

	1982	1983	1984	1985	1986
Net Sales	6,325	6,299	6,69	6,747	6,879
Cost of Goods Sold	4,804	4,734	4,839	4,841	4,344
Marketing and Administrative Expenses	691	681	722	919	1,244
Technological Expenses	329	359	446	548	59
Amortization of Intangible Assets	-	4	7	88	218
Restructuring Expense (Income)	-	-	-	949	(158)
Operating Income (Loss)	501	521	677	(598)	635
Interest Income (Expense)	(19)	(23)	(8)	(115)	(160)
Provision for Income Taxes	172	201	268	(170)	203
Other Income (Expense)	42	71	38	445	161
Net Income	352	368	439	(98)	433
Total Assets	6,077	6,427	6,373	8,877	8,269
Long-term Obligations	524	590	1,537	3,092	2,772
Shareholders' Equity	3,512	3,671	3,810	3,651	3,781
Current Assets	2,454	2,755	2,597	3,277	2,808
Current Liabilities	951	1,220	1,202	2,378	1,716

Business Segment Results

	1982[a]	1983	1984	1985	1986
Net Sales					
Agricultural Products		1,250	1,338	1,152	1,153
Chemicals		4,148	4,360	4,051	3,548
Electronic Materials		120	220	137	154
Fisher Controls		535	550	652	645
NutraSweet		-	-	317	711
Pharmaceuticals		-	15	262	665
Oil & Gas		241	203	172	-
Biotechnology Product Discovery		-	-	-	-
Corporate		5	5	4	3
TOTAL		6,299	6,691	6,747	6,879
Operating Income (Loss)					
Agricultural Products		366	389	243	283
Chemicals		230	336	234	613
Electronic Materials		(56)	4	(67)	(139)
Fisher Controls		24	27	36	(66)
NutraSweet		-	-	58	142
Pharmaceuticals		(15)	(30)	(84)	(119)
Oil &Gas		41	27	16	-
Biotechnology Product Discovery		(21)	(24)	(31)	(41)
Corporate		(48)	(52)	(54)	(38)
TOTAL		521	677	351	635

Exhibit 4 (continued) Monsanto Corporation: Financial Data ($ millions)

Business Segment Results (continued)

	1982[a]	1983	1984	1985	1986
Research and Development					
Agricultural Products		92	129	142	135
Chemicals		14	22	32	105
Electronic Materials		112	131	128	15
Fisher Controls		13	23	20	21
NutraSweet		-	-	11	25
Pharmaceuticals		15	24	96	177
Oil & Gas		21	-	-	-
Biotechnology Product Discovery		21	24	31	39
Corporate		23	25	26	6
TOTAL		311	378	486	523
Total Assets					
Agricultural Products		1,401	1,420	1,235	1,156
Chemicals		3,201	3,222	2,982	2,704
Electronic Materials		253	280	302	228
Fisher Controls		503	536	636	612
NutraSweet		-	-	1,862	1,883
Pharmaceuticals		3	80	1,438	1,394
Oil & Gas		543	578	-	-
Biotechnology Product Discovery		15	31	33	50
Non-operating Assets		508	226	389	242
TOTAL		6,427	6,373	8,877	8,269
Capital Expenditure					
Agricultural Products		169	119	115	88
Chemicals		213	279	291	244
Electronic Materials		26	47	55	51
Fisher Controls		29	32	53	38
NutraSweet		-	-	4	39
Pharmaceuticals		4	7	33	53
Oil & Gas		101	107	85	-
Biotechnology Product Discovery		15	17	3	6
Non-operating Assets		3	6	6	1
TOTAL		560	614	645	520

Exhibit 4 (continued) Monsanto Corporation: Financial Data ($ millions)

Business Segment Results (continued)

	1982[a]	1983	1984	1985	1986
Depreciation and Amortization					
Agricultural Products		90	100	110	105
Chemicals		298	273	248	236
Electronic Materials		28	30	37	122
Fisher Controls		20	21	28	36
NutraSweet		-	-	73	205
Pharmaceuticals		1	7	39	67
Oil & Gas		85	69	59	-
Biotechnology Product Discovery		1	1	2	7
Corporate		1	2	3	2
TOTAL		524	503	599	780

Source: Monsanto Corporation Annual Reports

[a]Business segment results unavailable due to restructuring.

Note: NutraSweet's share of the European joint venture's earnings are reflected in "Other Income (Expense)" in the Financial Summary.

Exhibit 5 Tosoh Corporation: Financial Data (¥ millions)

Financial Summary

	1982	1983	1984	1985	1986
Net Sales	206,121	208,137	252,661	251,722	246,565
Cost of Goods Sold	169,734	167,661	195,283	184,155	181,245
SG&A	30,550	31,179	37,234	41,675	46,018
Operating Income	5,837	9,297	20,144	25,892	19,302
Interest Income (Expense)	(15,671)	(17,167)	(17,305)	(16,365)	(16,220)
Provision for Income Taxes	100	-	150	3,036	4,406
Other Income (Expense)	(3,495)	5,349	4,682	5,007	5,964
Net Income	(13,429)	(2,521)	7,371	11,498	4,640
Total Assets	273,881	270,681	309,789	325,036	348,094
Long-term Obligations	98,479	95,044	87,276	72,766	84,114
Shareholders' Equity	21,468	21,662	33,383	45,374	49,172
Current Assets	120,316	116,618	156,149	161,647	160,199
Current Liabilities	137,509	139,881	185,797	203,865	211,890

Sales by Business Segment

	1982	1983	1984	1985	1986
Net Sales					
Chemical Products	50,350	52,851	49,490	42,589	40,869
Petrochemicals	72,670	72,805	92,342	92,084	89,684
Portland Cement	34,997	31,153	28,470	27,195	26,037
Fertilizers	10,007	7,752	7,147	6,475	6,382
Metal Products	13,068	13,486	14,246	15,463	14,317
Fine Chemicals and Specialty Products	25,029	30,090	32,636	39,165	40,909
Other	-	-	28,330	28,751	28,367
TOTAL	206,121	208,137	224,331	222,971	218,198

Source: Tosoh Corporation Annual Reports

Exhibit 6 N.V. DSM: Financial Data (D.Fl. millions)

Financial Summary

	1982	1983	1984	1985	1986
Net Sales	18,172	19,750	22,530	23,667	17,712
Cost of Goods Sold	n/a	n/a	20,243	21,585	15,743
SG&A	n/a	n/a	1,268	1,243	1,242
Operating Income	n/a	n/a	1,019	839	727
Interest Income (Expense)	n/a	n/a	(210)	(145)	(83)
Provision for Income Taxes	n/a	n/a	256	263	216
Other Income (Expense)	n/a	n/a	(90)	(29)	(16)
Net Income	(188)	164	463	402	412
Total Assets	9,188	10,241	12,297	13,375	10,030
Long-term Obligations	n/a	n/a	2,500	2,084	2,006
Shareholders' Equity	2,088	2,163	2,625	2,838	2,979
Current Assets	n/a	n/a	7,054	8,279	4,994
Current Liabilities	n/a	n/a	6,061	7,010	3,786

Sales by Business Segment

	1982	1983	1984	1985	1986
Net Sales					
Agro[a)]	n/a	n/a	3,211	3,167	2,091
Chemical Products	n/a	n/a	2,655	2,587	1,950
Plastics	n/a	n/a	3,687	3,809	2,581
Resins	n/a	n/a	1,090	1,030	1,108
Plastic Products	n/a	n/a	754	795	748
Energy and Other	n/a	n/a	12,750	14,223	10,690
Eliminations	n/a	n/a	(1,617)	(1,944)	(1,456)
TOTAL	18,172	19,750	22,530	23,667	17,712
Net Sales by Destination					
Netherlands	n/a	n/a	8,447	9,065	6,861
Other EC Countries	n/a	n/a	10,506	11,611	8,847
Rest of Europe	n/a	n/a	739	676	477
North America	n/a	n/a	1,404	1,101	554
Rest of the World	n/a	n/a	1,434	1,214	973
TOTAL	18,172	19,750	22,530	23,667	17,712

Source: N.V. DSM Annual Reports

[a]Mainly fertilizers.

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Power Play (A): Nintendo in 8-bit Video Games

One strong company and the rest weak.

Hiroshi Yamauchi, President, Nintendo Co., Ltd.[1]

The origins of home video games went back to 1966, when an engineer at Sanders Associates, a U.S. military systems consulting firm, developed a ball-and-paddle game called *Odyssey* that could be played on a TV set. But the industry really began in 1972 with the founding of Atari Corporation, which enjoyed huge success with a table tennis video game called *Pong*. By 1982, the U.S. home video game industry reached $3 billion in retail sales. Then the market collapsed, with sales plummeting to under $100 million in 1985. A flood of low-quality software was blamed for the bust, and home video games were dismissed as yet another toy fad.

The Japanese company Nintendo (the name means something like "Work hard, but in the end it is in heaven's hands") began life in 1889 as a manufacturer of handmade playing cards. In the post World War II period, the company expanded into a variety of novelty toys and games. In 1977, Nintendo began making a home video game system in Japan under license from U.S. television manufacturer Magnavox—which had licensed the Sanders technology back in 1971.

In 1983, Nintendo launched a new video game system, the Famicom ("Family Computer"), in Japan. The company also developed games specially tailored to its new piece of hardware, such as the hits *The Legend of Zelda* and *Metroid*. In 1985, Nintendo released the smash hit *Super Mario Brothers*. "Nintendomania" had begun. The U.S. launch of the Famicom, under the name Nintendo Entertainment System (NES), followed in 1986.

By 1990, home video games had become a $5 billion worldwide industry. A Nintendo Famicom/NES could be found in one out of every three households—in both Japan and the United States. Cumulative sales of the *Super Mario Brothers* game series alone topped 40 million copies.

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[1]David Sheff, *Game Over: How Nintendo Conquered the World* (New York: Vintage, 1993), p. 71.

Professor Adam M. Brandenburger prepared this case as the basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation. The case draws on reports by Anna Minto (MBA'93), Michael Maples, and Michael Tuchen (MBAs'94). Assistance from Research Associate Monique Burnett, Rena Henderson, Brad Ipsan, and Research Assistant Julia Kou is gratefully acknowledged.

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A survey that year found that the Nintendo character Mario was more popular than Mickey Mouse among U.S. children.

From mid-1990 through mid-1991, Nintendo's stock market value exceeded that of Sony or Nissan. (Refer to **Table A** below, and to **Exhibit 2** for further financial data on Nintendo.)

Table A Average Stock Market Values, July 1990 through June 1991

Company	(¥ trillions)
Nintendo	2.406
Sony	2.212
Nissan	2.032

Source: Datastream

Home Video Game Systems

Video games were a form of home entertainment targeted principally at 6- to 14-year-old boys. Players of video games controlled game characters on a TV screen, vanquishing foes, seeking hidden treasure, playing sports, and the like.

A home video game system consisted of three types of component: a console, controllers, and cartridges. The console was essentially a microprocessor-based computer optimized for graphics processing capabilities. It was designed to receive information from the controllers, process it according to instructions contained in the game cartridge, and send signals to the TV monitor. Controllers were hand-held devices used to direct the on-screen action. Often, more than one controller could be attached to the console allowing for game play among several people. When a player pushed the buttons or joystick on the top of the controller, a signal was transmitted to the console. Cartridges contained chips encoding the instructions for a particular game. They were designed to be inserted into the console.

At the broadest level, three technical factors determined the quality of the games that a particular video game system could run: data width (in bits), clock speed (in MHz), and the amount of RAM (in bytes). Early machines were 4-bit systems. Later-generation machines were 8-bit, then 16-bit, and, by the early 1990s, 32-bit systems. Early machines ran at 2 MHz and had up to 16 kilobytes of RAM. Newer machines ran at 12.5 MHz and had up to 2 megabytes of RAM. **Exhibit 1** lists technical specifications of various home video game systems and—for the sake of comparison—those of leading personal computers of the same period.

The technical limitations of early video game systems restricted on-screen objects to two-dimensional shapes that could move only from side-to-side. Sounds were limited to beeps, bells, and bursts. For example, *Pac-Man* (home version introduced in 1982) was an 8-kilobyte game that contained fewer than 20 different scenes and depicted only outlined shapes in a narrow range of colors. By the mid-1980s, 256-kilobyte games became available that boasted more realistic graphics and sounds, and were both faster and much more complex. Nintendo's *The Legend of Zelda*

(1987), for example, contained 600 separate scenes, including forests, lakes, mountains, and deserts. In the game, it could take several weeks to rescue the imprisoned princess.

Atari

Atari (which means "Check" in the Japanese game Go) was founded in 1972 by entrepreneur Nolan Bushnell. A computer addict from an early age, Bushnell had previously worked as an engineer in Silicon Valley. In his spare time, he had conceived the idea of a fixed-purpose game-playing computer.

The Arcade Game Business

In the early 1970s, coin-operated game machines were electromechanical devices, costing around $1,000, that played games such as pinball, shuffleboard, and football. Manufacturers sold the machines to distributors, who sold or leased them to operators who, in turn, placed the machines in arcades, malls, bowling alleys, and other locations. Players of arcade games were predominantly youths of elementary and high-school age.

At Atari, Bushnell and his team developed a computer-based arcade machine called *Pong*, in which two players batted a light beam back and forth between on-screen paddles. At a time when the best arcade game grossed $45 a week, *Pong* machines brought in $200 a week.[2]

Less than three months after *Pong* came out, arcade game manufacturers started putting out *Pong* look-alike games. By 1974, copying was rampant. Of the 100,000 *Pong*-like games produced that year, only about a tenth were made by Atari itself.[3]

The Home Market

Bushnell decided it was now time to target the home market. The *Pong* machine was compressed down to a few integrated circuits, designed to be hooked up to a TV. In 1975, Bushnell introduced *Home Pong* at the toy industry show. A total of 150,000 *Home Pong* games were sold in the first year.

In 1976, the U.S. electronics company Fairchild (which had been a pioneer in semiconductor technology) came out with the first video game system capable of playing multiple games. The Fairchild system used the console and plug-in cartridge format that would become the standard. A similar system, the 2600 VCS ("video computer system"), was under development at Atari. Bushnell decided he had to sell Atari to a cash-rich company able to push the VCS project to completion. The purchaser was U.S. media company Warner Communications. Atari's VCS was launched onto the market in late 1977 at a $200 retail price. Associated cartridges cost $5-$10 to manufacture and retailed for $25-$30.

By the 1978 Christmas season, the home video game business had attracted the electronics companies RCA, National Semiconductor, and General Instrument, and the toy maker Coleco, among

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[2]Scott Cohen, *Zap! The Rise and Fall of ATARI* (New York: McGraw-Hill, 1984), p. 34.
[3]*Ibid.*, p. 39.

many other players. But unexpectedly low sales led to a big shakeout, with only Atari and Coleco surviving. Bushnell stepped down from Atari soon afterwards.

As of 1979, the VCS had a two-thirds share of the installed base of home video game systems in the United States. The same year, four of Atari's engineers left to set up their own firm, Activision, to make VCS-compatible video games. Activision's quick success stimulated other programmers to defect from Atari and set up independent houses making games for the VCS.

Fueled by the runaway success of the arcade game *Space Invaders* (invented by the Japanese arcade game company Taito), the home video game market quickly bounced back from the 1978 crash. Atari licensed *Space Invaders* for the VCS. It had other hits with *Asteroids*, adapted from an Atari arcade game, and *Pac-Man*, licensed from the leading Japanese arcade game maker Namco. Coleco and rival toy maker Mattel, a recent entrant into video games, came out with second-generation game systems boasting improved graphics. Coleco also developed an expansion module which allowed its machine to play Atari games. Atari and Mattel, in turn, adapted Coleco games to their platforms.

By 1982, a total of 17% of U.S. homes had a video game system. Retail sales of video game products that year hit $3 billion. Atari came out with a second-generation system, the 5200 Super VCS. Featuring improved game play, the Super could not, however, run cartridges for the VCS.

Then the U.S. home video game market collapsed again, with retail sales plummeting to under $100 million in 1985. A flood of low-quality software was blamed for the bust. Atari itself was brought down as a result of an overbuilt inventory—losing as much money on the way down as it had made on the way up. During this period, Nintendo approached Atari with a view to licensing the non-Japanese rights to the Famicom. But with Atari unraveling, the negotiations fizzled out. Warner sold off Atari's hardware divisions, which were re-formed under the name Atari Corporation. The coin-op business was sold, as Atari Games, to Namco.

While home video games were dismissed as yet another toy fad, the arcade business proved more resilient. In the mid-80s, around $5 billion was being spent annually at coin-op machines in the United States.

Nintendo in Japan

Nintendo, based in Kyoto, Japan, was controlled by the old, established Yamauchi family. In the early part of this century, the company was the largest maker of Japanese playing-cards, introducing Western-style cards and building a sales force that called on shops all over Japan. The third president of Nintendo, Hiroshi Yamauchi, took over the reins in 1949 and looked for ways to expand operations. In 1959, Nintendo entered a licensing agreement with Walt Disney to produce cards backed with pictures of Mickey Mouse and other Disney characters. A new distribution system was created to get the cards into toy and department stores throughout Japan. In the late 1960s, the company began putting out a series of toys, including mechanical hands, pitching machines, periscopes, and a shooting game that used a light beam and solar cells. The next move was converting former bowling alleys into shooting ranges that used the company's light beam/solar cell technology.

Finding his company overextended in the wake of the 1973 oil crisis, Yamauchi looked around for new business opportunities. He acquired a license to manufacture and sell Magnavox's home video game system in Japan and, in 1977, teamed up with electronics giant Mitsubishi to

launch a machine that played variations on *Pong*. The following year, Nintendo started putting out coin-op video games. In 1980, Nintendo put out Game & Watch, a handheld combination of video game and digital clock. The product sold strongly, although counterfeiting was a continual problem. In 1981, Nintendo had its first smash hit with the coin-op video game *Donkey Kong*, designed by ace Nintendo designer Sigeru Miyamoto.

The Famicom

By 1983, there were several players in the Japanese home video game industry, including Atari and the computer manufacturer Commodore from the United States and Casio and Sharp from Japan. The game systems sold for around ¥50,000-80,000 ($200-350).

At Nintendo, Yamauchi was directing work on an entirely new video game system that would be cheaper than the competition's, while at the same time having superior graphics (52 colors and 256×240 pixels) and faster action. The plan was to find a way of reproducing the "feel" of Nintendo's arcade games on a much less powerful home machine. Considerable effort went into extracting the necessary performance from a standard 8-bit microprocessor (dating back to the 1970s). The sole feature of the system not aimed specifically at maximizing image quality was a connector that allowed for future addition of a modem or keyboard. The cartridges contained several chips. One held the game program itself. A second, the "security" chip, ensured that only Nintendo-approved cartridges would be able to run on the system. To keep the hardware cost down, each cartridge also included some code (needed for console operation) that was common across games, and which was read into the system's memory each time a game was loaded.

All manufacturing for Nintendo's new game system was subcontracted, with final assembly alone taking place at the company's facilities. Specialized chips were sourced from electronics giant Ricoh, which had spare capacity at the time. Nintendo extracted a rock-bottom ¥2,000 ($8) price for the chips by placing a three-million unit order.

Launched in 1983, Nintendo's Famicom looked more like a toy than a computer. At a ¥24,000 ($100) price, widely believed to be at or below cost, the Famicom significantly undercut the competition.

Game Development

Games for the Famicom were designed by an R&D team at Nintendo. As a matter of policy, R&D personnel were kept insulated from the marketing people. Yamauchi believed that this improved the chances of coming up with truly fresh game concepts. Once the concept for a game was in place, development involved preparing the art, the audio, and the actual computer code. Dedicated tool sets and utilities were developed to accelerate software programming for the Famicom.

Development costs ran up to ¥100 million ($500,000) per game title, and marketing expenses to several hundred million yen. Nintendo's approach was to focus resources on trying to come up with one or two hit games per year rather than with several minor successes. Teams of up to 20 people worked on a new game over a 12- to 18-month period. Manufacture of game cartridges was subcontracted—at a unit cost of around ¥1,500 ($6-$8). Cartridges retailed for around ¥8,000 ($40) apiece.

Over time, the Nintendo engineers learned to make more and more complex games by using powerful new chips in the cartridges to take over processing activities from the console. Among the

hit games put out by the Nintendo team were *Super Mario Brothers* (1985), *The Legend of Zelda* (1987), and *Metroid* (1987)—the first two, further creations of Miyamoto. As Nintendomania took hold, makers of competing home video game systems withdrew from the market.

Licensing

With demand for games for the Famicom outstripping supply, Nintendo decided to license other companies to develop games for its system. The initial licensees were Namco, Hudson (a computer-software maker), Taito, Konami (another maker of computer and coin-op games), Capcom (developer of a variety of games with Disney characters), and Bandai (Japan's largest toy maker). These first six licensees paid royalties to Nintendo set at 20% of the ¥6,000 ($30) price at which cartridges wholesaled.

By 1988, there were 50 licensees. All except the original 6 were required to place manufacturing orders with Nintendo itself. (In accordance with its outsourcing policy, Nintendo in turn subcontracted licensees' orders to outside manufacturers.) Licensees were charged the 20% royalty, and also had to absorb Nintendo's manufacturing cost. They were further required to place minimum orders of 10,000 units—payable in advance. Later, licensee contracts were modified to limit the number of game titles that any one company could release in a year.

One small software house, Hacker International, found a way around the Nintendo security chip and started selling unauthorized games for the Famicom by mail order.[4] To generate interest in its games, Hacker placed ads in *Family Computer*, one of many magazines that had sprung up to give tips on Nintendo games. A day after the first in a projected series of ads appeared, Hacker learned that the remaining ads had been canceled. *Family Computer* followed up with a public apology to Nintendo.

In 1989, Namco's original license came up for renewal. Yamauchi made it clear that the terms of the new contract would be the same as those extended to the later licensees. Masaya Nakamura, head of Namco, responded angrily: "The game industry is still new. I want it to grow soundly. Nintendo is monopolizing the market, which is not good for the future of the industry. . . . Nintendo should consider itself the leader of the video-game industry and accept the responsibility that goes along with it."[5] Still, Nakamura accepted the new contractual arrangements.

Position in the Late 1980s

With cumulative sales of Famicoms from 1983 to 1990 reaching 17 million units, or more than one system for every three Japanese households, Nintendo was estimated to have a 95% share of the Japanese 8-bit home video game market. On average, Japanese consumers bought 12 cartridges for every Famicom system purchased. (Refer to **Table B**.)

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[4]Sheff, *Game Over*, pp. 71-72.
[5]*Ibid.*, p. 74.

Table B Japanese Unit Sales of Nintendo 8-bit Systems (millions)

--1983	1984	1985	1986	1987	1988	1989	1990
1.4	2.1	3.2	3.9	1.8	1.7	1.4	1.3

Sources: Nintendo Co., Ltd. Annual Reports; *Tokyo Business Today*, May 1993; casewriter estimates

Nintendo continued with its outsourcing policy, working now with some 30 subcontractors, including many of the leading chip makers. It had become Ricoh's largest customer, accounting for 60%-70% of the company's semiconductor sales. Nintendo employed 200 people in R&D, 350 in administration, and 310 in manufacturing.

In 1988, Nintendo launched the Family Computer Communications Network System. A $100 modem and a special cartridge transformed the Famicom into a terminal that could interact with other terminals or with a central computer. Nintendo struck an agreement with Nomura Securities, the largest Japanese brokerage house, that enabled Famicom owners to monitor and trade stocks by computer. By 1991, a total of 130,000 households had joined the network, which offered, in addition to stock-brokerage services, home shopping, on-line banking, rail and airline reservation services, electronic mail, and access to information about new video games. Nintendo charged users for on-line time, and information and service suppliers for access to its user base.

Nintendo in the U.S.

In 1980, Nintendo established a U.S. subsidiary, Nintendo of America ("NOA"), subsequently headquartered in Redmond, Washington. The operation was led by Yamauchi's son-in-law Minoru Arakawa, who came from a leading Kyoto family and had previously studied and worked in the U.S. and Canada. NOA had a shaky start importing Nintendo coin-op games in an attempt to gain a foothold in the U.S. arcade game business. But then Miyamoto's *Donkey Kong* arrived from Japan, propelling NOA to 1981 sales of $100 million. Further revenue came from licensing of the game (to Coleco) and of the characters (for use on T-shirts, cereal packets, etc.). Nevertheless, it was estimated that as many as half the *Donkey Kong* games on the market were counterfeits, leading NOA to file numerous copyright infringement suits.

In 1983, NOA entered the U.S. consumer market with Game & Watch, brought over from Japan. The product, aimed at the toy market, was a failure.

The Nintendo Entertainment System

In 1985, Arakawa decided to try to launch the Famicom in America. However, initial approaches to toy retailers met with an unenthusiastic response. The decision was made to re-position the video game system as a consumer electronics product rather than a toy. It was redesigned to look more like a computer and given a hi-tech package. New patented and copyrighted encryption technology was also included. Retailers remained gun-shy.

Arakawa mounted a direct effort to sell the $100 Nintendo Entertainment System (NES), as the re-designed video game system was called, in New York City. NOA targeted electronics retailers and offered to stock stores for free, with retailers having to pay for only what they had managed to sell after 90 days. To the surprise of the trade, consumer reaction was favorable. A national roll-out followed in 1986.

Licensing

NOA initiated an outside game development program similar to the one Nintendo ran in Japan. It limited each licensee to five NES titles a year. All games for the NES were vetted against a set of standards that included a ban on any excessively violent or sexually suggestive material. Licensees had to place orders for manufacture of approved games with NOA at a cost of about $14 per cartridge. (Cartridges wholesaled for around $30 apiece, and were marked up another $15 or so at retail.) It took a licensee around nine months to develop a new game, one month to test it, and one month to gain approval from Nintendo. Licensees then had to place minimum orders of 30,000 units (payable in advance) with NOA and wait 3 months to receive their orders at the shipping dock in Kobe, Japan. Distribution of cartridges was the licensees' responsibility. A new contractual feature was an exclusivity clause, which prohibited licensees from releasing NES titles for other video game systems, or outside North America, for two years.

Early licensees were, for the most part, U.S. subsidiaries of Japanese companies that imported arcade games or worked with Nintendo in Japan. Konami scored a notable success with the NES games based on the *Teenage Mutant Ninja Turtle* characters, which had been developed by a pair of freelance artists. The first American licensee was Acclaim Entertainment, founded in 1987 for the specific purpose of developing games for the NES. Well-known Acclaim games included *Total Recall* (based on the Arnold Schwarzenegger movie), *Roger Rabbit*, several *Spider Man* games (based on the Marvel Entertainment Group comic book character), *NFL Football*, and *The Simpsons*.

A late signee was Electronic Arts, which had been founded in 1982 by Trip Hawkins, then 28 and a veteran of Apple Computer. (Before that, Hawkins had designed his own major at Harvard in strategy and game theory and also started his own business with $5,000, making table-top football games.) Hawkins had envisioned that personal computers would come to play a multipurpose role in homes—everything from household finances to game playing. He had therefore concentrated his efforts on designing floppy-disk-based games for personal computer platforms such as the Apple and IBM. But while Electronic Arts had found success with celebrity-endorsed sports games (such as *John Madden Football*), computer games had proved to be a limited business, bringing in a total of only $250 million in 1989. While he had licensed some Electronic Arts games to video game developers, Hawkins decided it was time to get directly involved and signed up with Nintendo in 1990. In an interview, Hawkins talked about the delay in getting into video games:

> It was my biggest mistake since starting the company. . . . Most of the people in the industry thought Nintendo couldn't succeed. Everyone figured it would be a Cabbage Patch doll kind of thing—that it would hold up for another year and then go the way of Atari and Coleco and the other video game systems that had disappeared. . . . There was another factor that kept us on the sidelines. . . . If you made software for Nintendo, you were restricted from moving to other video game machines for two years. . . . We didn't want to put all our eggs in one basket. But after a while there were so many Nintendos out that it was a moot point.[6]

Hawkins stepped aside from day-to-day management of Electronic Arts in 1991. The rumor was that he was working on a secret new video game system.

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[6]"Trip Hawkins Interview," *Upside*, August/September 1990, p. 48.

By 1991, there were 100 licensees for the NES; only around 10% of software development remained in-house at Nintendo. Over 450 titles were available for the NES.

In addition to licensing the rights to develop games for the NES platform, NOA licensed its game characters to a wide variety of other businesses. Mario and the other Nintendo creations turned up on TV shows, cereal packets, T-shirts, records and tapes, in books and board games, as toys, and elsewhere.

Marketing and Distribution

NOA employed highly targeted advertising tied to new game releases. The advertising budget ran to about 2% of sales. NOA also sought out promotion partners, such as Pepsi, Procter & Gamble, and McDonald's.

In 1988, Arakawa started a magazine, called *Nintendo Power*, for NES users. The magazine gave tips on existing games, announced new releases, and rated games. It carried no advertising and was priced to break even. By 1990, readership was estimated at 6 million each month, making *Nintendo Power* the highest-circulation magazine targeted to children in the United States. NOA also set up a consumer hot-line, with game counselors available to give hints—but not complete answers—on how to play the games. "We don't just give away secrets," one counselor said. "We are trained in the Socratic method of game counseling."[7] Callers' names and addresses were added to NOA's mailing list. Software licensees got the benefit of write-ups in *Nintendo Power* and consumer service through the game counselors.

In the winter of 1989, Universal Studios put out the movie *The Wizard*, showcasing the soon-to-be-released Nintendo game, *Super Mario Brothers 3*.

Nintendo products were now distributed through toy stores (30% of total volume), mass merchandisers (40%), and department stores (10%), as well as electronics retailers and other outlets. In 1989, the U.S. toy industry had retail sales of $13 billion. Spending on Nintendo products accounted for over 20% of the total. Leading toy retailer Toys "R" Us earned in excess of 20% of its profits from Nintendo merchandise. It was traditional in the toy business for retailers to place orders in January or February for product to be shipped in the summer, and then to pay all bills on December 10th. Nintendo, however, required that retailers place orders, take delivery, and pay in quick succession. Leading mass merchandisers Wal*Mart and Kmart both carried Nintendo products; Wal*Mart did not stock competing video game systems.

NOA set up interactive displays in stores nationwide, allowing anyone to stop and try the NES. Eventually, 10,000 outlets had "World of Nintendo" displays—stores-within-a-store showcasing Nintendo products, all of which carried the Nintendo Seal of Quality. In 1991, NOA opened a 360,000-square-foot, robot-controlled distribution center capable of shipping up to 600,000 systems and games directly to stores every day.

NOA practiced careful inventory management in releasing its new games. It maintained strict control of the number of copies put out and withdrew games quickly as soon as interest waned. It did not fill all of the retailers' demands, and kept more than half of its game library inactive. For example, in 1988, retailers requested 110 million cartridges from Nintendo; market surveys

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[7]Sheff, *Game Over*, p. 183.

indicated that perhaps 45 million could have been sold, but Nintendo released only 33 million units to the marketplace.[8]

The scarcity of games became especially pronounced from mid-1988 to mid-1989. A temporary worldwide chip shortage was, at least in part, to blame. But allegations of abuse of power by Nintendo also began to surface from game developers, retailers, and even members of Congress. A profile of Peter Main, vice-president of marketing at NOA, ran: "To his admirers . . . [he] is a master seller of children's entertainment. . . . To his critics, however, he is an aspiring monopolist, squeezing supply and jacking up profits."[9] Complaints also were voiced that Nintendo threatened to cut off retailers if they carried competitors' products or discounted Nintendo machines and games.

Position in the Late 1980s

By 1990, Nintendo had a greater-than-90% share of the U.S. home video game market. Around 30 million NES units had been sold, or one system for every three U.S. households (refer to **Table C**). Of U.S. households with boys between the ages of 8 and 15, some 70% to 75% now had video game systems. American consumers bought around 8 or 9 game cartridges for every NES purchased.

Table C U.S. Unit Sales of Nintendo 8-bit Systems and Cartridges (millions)

	1986	1987	1988	1989	1990
Systems	1.1	4.2	7.0	9.1	6.7
Cartridges	3	10	33	53	50

Sources: Nintendo Co., Ltd. Annual Reports; *Toy Industry Review 1992*, Gerald Klauer Mattison & Co., October 1992; casewriter estimates

Note: Cartridge figures include licensees' sales

The Nintendo phenomenon became a "cultural" issue. While some people claimed that a generation of so-called vidiots was being raised, others countered that the games aided development of problem-solving, memory, and other skills. Video game terminology entered the language. Referring to the 1991 Gulf conflict, U.S. General Norman Schwarzkopf dubbed it "the first Nintendo war."[10]

In 1989, NOA announced its intention to set up a network linking American households that had the NES. The long-distance phone company AT&T was slated to be the carrier. Initial plans for the network focused on providing on-line stock-brokerage and banking services, but were soon abandoned in favor of an entertainment focus. Work began on the programming required to support video-game chat lines, downloading of games, and real-time game playing between users at different locations. But progress was slow and the joint venture with AT&T was subsequently dissolved.

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[8]"Nintendo Paces Videogames: Attention Turns to Adults and New Product Tie-ins," *Advertising Age*, January 30, 1989, p. 24; "Marketer of the Year," *Adweek*, November 27, 1989, p. 15.

[9]The Games Played for Nintendo's Sales," *New York Times*, December 21, 1989, p. D1.

[10]Sheff, *Game Over*, p. 285.

Game Boy

In April 1989, Nintendo launched Game Boy in Japan. A handheld, monochrome video game system, Game Boy was a cross between the NES and the earlier Game & Watch. It was designed to broaden the appeal of video games beyond pre-teenagers to older children and adults. The U.S. release of Game Boy followed that July. Game Boy was priced at $100, with special compact game cartridges costing from $20 to $25.

Bundled with the game *Tetris*, which Nintendo had acquired from the Russians, Game Boy was an immediate hit. NOA planned to ship a total of 1 million Game Boys by the end of 1989, although Peter Main admitted: "Based on what our retailers are telling us, real demand in the U.S. this year could be between 2 to 3 million units."[11] Toys "R" Us tried—unsuccessfully—to secure the entire first shipment of Game Boys.

Through 1992, a total of 32 million Game Boys were sold worldwide, with consumers buying, on average, three games a year to play on the system.

Legal Maneuvers

In 1987, Atari Games was bought out by its managers and employees, with Warner coming back in for a majority stake. Tengen, an Atari Games subsidiary, signed up as a Nintendo licensee in January 1988. In December, Atari Games filed suit, charging that the purpose of the NES security chip was literally to lock out competition in the market for Nintendo-compatible game cartridges. Atari Games also announced that it had found a way around the encryption technology and would begin selling unlicensed Nintendo games. Atari Games indicated to NOA that it would drop the legal action and accept the terms of licensee status if it were allowed to do its own manufacturing. NOA rejected the offer, and Atari Games went into the marketplace with its Tengen games. Unauthorized by Nintendo and lacking the Nintendo Seal of Quality, the games met resistance from both consumers and retailers.

In a March 1991 ruling, Atari Games was found to have obtained the Nintendo security code illegally, and was ordered to stop selling NES-compatible cartridges.

Atari Corporation had tried, unsuccessfully, to launch a successor to the Atari Super VCS. In 1989, it, too, filed suit against NOA, charging that NOA's exclusivity clause amounted to unfair restraint of trade. The suit was decided in NOA's favor in May 1992.

Against a climate of strained American-Japanese relations, Nintendo's successes in the U.S. began to attract attention in Washington. On December 7, 1989 (Pearl Harbor Day), Rep. Dennis E. Eckart (D-Ohio), chairman of the House Subcommittee on Antitrust, Deregulation and Privatization, held a press conference at which he requested that the Justice Department investigate allegations that Nintendo unfairly reduced competition. Eckart said that the Subcommittee had begun investigating Nintendo in early 1989 in response to consumer complaints. NOA officials charged that the investigation was instigated by Atari Games, and complained that the Subcommittee had not even asked to hear their side of the story.

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[11] "Top Video Game Companies Expect Solid Fourth Quarter," *Home Furnishings Daily*, October 23, 1989, p. 145.

Eckart's letter to the Justice Department outlined five specific areas of concern to the Subcommittee. The first was the alleged anti-competitive purpose of the NES security chip. The second turned on the licensing agreements with software developers who, the letter alleged, "became almost entirely dependent on Nintendo's acceptance of their games and production allocations." The letter further alleged that Nintendo had artificially created shortages of its equipment and games during the Christmas 1988 season. The letter said that some evidence existed that the shortages were "contrived to increase consumers' price and demand and to enhance Nintendo's market leverage." The fourth area of concern was Nintendo's practice of bundling software with hardware. Finally, the Subcommittee charged that Nintendo had "aggressively exercised its market power" by threatening retailers with limits on their supply, or with cutting them off, if competitors were given shelf space. This coercion by Nintendo would seriously impede any potential competitors and decrease consumer choice, the letter said. Eckart asserted that, as a result of these various practices, "The net result is that there is only one game in town."

At the same time, the Attorneys General of two states, New York and Maryland, began investigating allegations that NOA had been coercing retailers into keeping the price of the game console at $99.95 or more.

In April 1991, NOA signed a consent decree with the Federal Trade Commission (FTC), along with the Attorneys General of New York and Maryland, and 39 other states, agreeing to stop actions which could be construed as resale price maintenance. The agreement did not affect the other aspects of the FTC's investigation of Nintendo. Under the terms of the settlement, NOA agreed to mail previous purchasers a $5-off coupon toward future purchases of Nintendo game cartridges—to the tune of at least $5 million and up to $25 million if sufficiently many qualified consumers applied. With respect to its treatment of retailers, NOA agreed to

Cease and desist from

1. Fixing, controlling, or maintaining, directly or indirectly, the resale price at which any dealer may advertise, promote, offer for sale or sell any product.

2. Requiring, coercing, or otherwise pressuring any dealer, directly or indirectly, to maintain, adopt or adhere to any resale price.

3. Securing or attempting to secure, directly or indirectly, any commitment or assurance from any dealer concerning the resale price at which the dealer may advertise, promote, offer for sale or sell any product.

4. Reducing the supply of products to any dealer or imposing different credit terms in whole or in part due to the dealer's resale price of any product.

5. Requesting dealers, directly or indirectly, to report the identity of other dealers who advertise, promote, or offer for sale or sell any product below any resale price.

6. For a period of five (5) years from the date on which this order becomes final, terminating any dealer due in whole or in part to the dealer's resale price of any product. Provided, however, that the respondent retains the right to terminate unilaterally any dealer for lawful business reason,

> unrelated to resale prices, that are not inconsistent with this paragraph or another paragraph of this order.[12]

While the New York State Attorney General proclaimed the settlement a major victory against vertical price-fixing, the business weekly *Barron's* took a different view:

> The legion of trustbusting lawyers would be far more productively occupied playing Super Mario Brothers 3 than bringing cases of this kind. . . . In their pursuit of . . . crooks, we wish the trustbusters well. But other authorities are in equally hot pursuit of Nintendo and other real business success stories, real achievements, real technological progress and real rewards.[13]

The FTC dropped its investigation of Nintendo in December 1992.

Nintendo, meanwhile, continued its fight against rentals of video games. It refused to supply rental stores direct, thus forcing them to buy games at retail. It also tried to get legislation passed in Congress banning rentals of video games outright or, failing that, prohibiting rentals for a year following the release of a title. It also continued the war against counterfeiting of games. In addition to taking legal action, Nintendo made numerous changes to the circuitry in the NES with a view to foiling technology developed by counterfeiters to disable the security chip.

A New Game

In late 1991, Seattle's major league baseball team, the Mariners, was put up for sale. A prospective buyer planned to move the team to Florida. In an effort to keep the Mariners in Seattle, a group of local investors that included top executives from Microsoft, McCaw Cellular Communications, Boeing, and Nintendo put together a bid. Yamauchi at Nintendo chipped in $75 million of the $125 million total, giving his voting interest to Arakawa. Uproar ensued when the baseball commissioner announced that he was opposed to transferring the Mariners to non-North American ownership. The deal finally went through in summer 1992.

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[12]*Federal Register* 56, no. 75 (April 18, 1991): 15883-15885.
[13]Editorial Commentary, *Barron's*, December 23, 1991, p. 90.

Exhibit 1 Technical Specifications of Home Video Game Systems and Personal Computers

System	Introduction Date	Data Width (# of bits)	Microprocessor	Clock Speed (MHz)	RAM (bytes)
Home Video Game Systems					
Atari 5200 Super VCS	1982	8	6502 (Standard)[a]	1.8	16K
Nintendo Famicom/NES	1983	8	6502	4	8K
Nintendo Game Boy	1989	8	6502	4	8K

System	Introduction Date	Data Width (# of bits)	Microprocessor	Clock Speed (MHz)	RAM (bytes)	Retail Price ($)
Personal Computers						
IBM PC	1981	8	Intel 8088	4.77	256K	3,800 1983: 2,100
IBM PC XT	1983	8	Intel 8088	4.77	512K	4,275 1985: 2,700
Apple IIe	1983	8	Motorola 6502A	1.4	64-128K	1,995 1986: 800
IBM PC AT	1984	16	Intel 80286	6	256-52K	3,995 1988: 2,300
Apple Macintosh	1984	16	Motorola 68000	8	128K	2,495 1987: 1,699
IBM PS/2 80	1987	32	Intel 80386	25-33	1M	6,995 1991: 2,250
Apple Macintosh II	1987	32	Motorola 68020	16	1-8M	6,000 1990: 3,300

[a]Available from MOS Technology, Rockwell, Synertek, and others.
Sources: Atari Corporation; Boston Computer Exchange; Datasources; *Dealerscope Merchandising*, Oct. 1991

Exhibit 2 Nintendo Co., Ltd.: Financial Summary (¥ millions)

	1984	1985	1986	1987	1988	1989	1990	1991	1992
Net sales	68,141	81,429	123,037	144,575	203,301	291,201	240,234	471,417	561,843
Cost of sales	NA	NA	NA	77,665	127,525	191,345	145,673	270,633	339,519
SG&A	NA	NA	NA	15,096	21,160	27,404	21,465	42,871	56,041
Other expenses	NA	NA	NA	2,211	569	3,403	4,206	13,193	9,442
Operating income	NA	NA	NA	49,603	54,047	69,049	68,890	144,720	156,841
Interest income (expense)	NA	NA	NA	5,688	8,273	8,809	6,275	16,857	23,992
Provision for income taxes	NA	NA	NA	30,422	32,707	43,067	39,984	94,345	93,688
Other income (expense)	NA	NA	NA	323	496	(520)	(2,251)	1,654	(41)
Net income	9,433	9,823	16,743	25,192	30,109	34,271	32,930	68,886	87,104
Total assets	69,398	80,755	129,600	149,357	213,209	279,073	342,619	425,372	517,205
Long-term obligations	NA	NA	NA	2,572	2,362	3,520	2,650	2,946	4,453
Shareholders' equity	39,878	48,227	76,931	99,540	126,476	157,249	189,811	250,623	328,548
Current assets	NA	NA	NA	129,560	182,447	242,288	303,646	361,226	460,384
Current liabilities	NA	NA	NA	47,455	84,161	118,304	150,158	171,803	184,204
Exchange rate (¥ per US$)	238	239	169	145	128	138	145	135	127

Source: Nintendo Co., Ltd. Annual Reports.

Note: For year ending August 31 (1984 through 1989).
For 7-month period ending March 31 (1990).
For year ending March 31 (1991 through 1992).

Prescott, History of the Conquest of Mexico

officer. He was indefatigable in his exertions, visiting every part of the island, and straining all his resources to effect his purpose. The preparations were on a scale that necessarily consumed many months.

Meanwhile the little vessel was speeding her prosperous way across the waters, and, after touching at one of the Azores, came safely into the harbour of St. Lucar, in the month of October. However long it may appear in the more perfect nautical science of our day, it was reckoned a fair voyage for that. Of what befell the commissioners on their arrival, their reception at court, and the sensation caused by their intelligence, I defer the account to a future chapter.[16]

Shortly after the departure of the commissioners, an affair occurred of a most unpleasant nature. A number of persons, with the priest Juan Diaz at their head, ill-affected from some cause or other, towards the administration of Cortés, or not relishing the hazardous expedition before them, laid a plan to seize one of the vessels, make the best of their way to Cuba, and report to the governor the fate of the armament. It was conducted with so much secrecy that the party had got their provisions, water, and everything necessary for the voyage, on board, without detection; when the conspiracy was betrayed, on the very night they were to sail, by one of their own number who repented the part he had taken in it. The general caused the persons implicated to be instantly apprehended. An examination was instituted. The guilt of the parties was placed beyond a doubt. Sentence of death was passed on two of the ringleaders; another, the pilot, was condemned to lose his feet, and several others to be whipped. The

[16] Bernal Diaz, Hist. de la Conquista, cap. 54-57.—Gomara, Crónica, cap. 40. — Herrera, Hist. general, dec. 2, lib. 5, cap. 14.—Carta de Vera Cruz, MS.—Martyr's copious information was chiefly derived from his conversations with Alaminos and the two envoys, on their arrival at court. De Orbe Novo, dec. 4, cap. 6, et alibi; also Idem, Opus Epistolarum (Amstelodami, 1670), ep. 650.

priest, probably the most guilty of the whole, claiming the usual benefit of clergy, was permitted to escape. One of those condemned to the gallows was named Escudero, the very alguacil who, the reader may remember, so stealthily apprehended Cortés before the sanctuary in Cuba.[17] The general, on signing the death-warrants, was heard to exclaim, "Would that I had never learned to write!" It was not the first time, it was remarked, that the exclamation had been uttered in similar circumstances.[18]

The arrangements being now finally settled at the Villa Rica, Cortés sent forward Alvarado, with a large part of the army, to Cempoalla, where he soon after joined them with the remainder. The late affair of the conspiracy seems to have made a deep impression on his mind. It showed him that there were timid spirits in the camp on whom he could not rely, and who, he feared, might spread the seeds of disaffection among their companions. Even the more resolute, on any occasion of disgust or disappointment hereafter, might falter in purpose, and getting possession of the vessels, abandon the enterprise. This was already too vast, and the odds were too formidable to authorize expectation of success with diminution of numbers. Experience showed that this was always to be apprehended while means of escape were at hand.[19] The best chance for success was to cut off these means. He

[17] See *ante*, p. 198.

[18] Bernal Diaz, Hist. de la Conquista, cap. 57.—Oviedo, Hist. de las Ind., MS., lib. 33, cap. 2.—Las Casas, Hist. de las Indias, MS., lib. 3, cap. 122.—Demanda de Narvaez, MS.—Rel. Seg. de Cortés, ap. Lorenzana, p. 41.—It was the exclamation of Nero, as reported by Suetonius. "Et cum de supplicio cujusdam capite damnati ut ex more subscriberet, admoneretur, 'Quam, vellem,' inquit, 'nescire literas!" Lib. 6, cap. 10.

[19] "Y porque," says Cortés, "demas de los que por ser criados y amigos de Diego Velasquez tenian voluntad de salir de la Tierra, habia otros, que por verla tan grande, y de tanta gente, y tal, y ver los pocos Españoles que eramos, estaban del mismo propósito; creyendo, que si allí los navíos dejasse, se me alzarian con ellos, y yéndose todos los que de esta voluntad estavan, yo quedaria casi solo."

WHARTON
9
107

108

came to the daring resolution to destroy the fleet, without the knowledge of his army.

When arrived at Cempoalla, he communicated his design to a few of his devoted adherents, who entered warmly into his views. Through them he readily persuaded the pilots, by means of those golden arguments which weigh more than any other with ordinary minds, to make such a report of the condition of the fleet as suited his purpose. The ships, they said, were grievously racked by the heavy gales they had encountered, and, what was worse, the worms had eaten into their sides and bottoms until most of them were not seaworthy, and some, indeed, could scarcely now be kept afloat.

Cortés received the communication with surprise; "for he could well dissemble," observes Las Casas, with his usual friendly comment, "when it suited his interests." "If it be so," he exclaimed, "we must make the best of it! Heaven's will be done!"[20] He then ordered five of the worst-conditioned to be dismantled, their cordage, sails, iron, and whatever was movable, to be brought on shore, and the ships to be sunk. A survey was made of the others, and, on a similar report, four more were condemned in the same manner. Only one small vessel remained!

When the intelligence reached the troops in Cempoalla, it caused the deepest consternation. They saw themselves cut off by a single blow from friends, family, country! The stoutest hearts quailed before the prospect of being thus abandoned on a hostile shore, a handful of men arrayed against a formidable empire. When the news arrived of the destruction of the five vessels first condemned, they acquiesced in it as a necessary measure, knowing the mischievous activity of the insects in these tropical

[20] "Mostró quando se lo dixéron mucho sentimiento Cortés, porque savia bien haçer fingimientos quando le era provechoso, y rrespondióles que mirasen vien en ello, é que si no estavan para navegar que diesen gracias á Dios por ello, pues no se podia hacer mas." Las Casas, Hist. de las Indias, MS., lib. 3, cap. 122.

seas. But, when this was followed by the loss of the remaining four, suspicions of the truth flashed on their minds. They felt they were betrayed. Murmurs, at first deep, swelled louder and louder, menacing open mutiny. "Their general," they said, "had led them like cattle to be butchered in the shambles!"[21] The affair wore a most alarming aspect. In no situation was Cortés ever exposed to greater danger from his soldiers.[22]

His presence of mind did not desert him at this crisis. He called his men together, and, employing the tones of persuasion rather than authority, assured them that a survey of the ships showed they were not fit for service. If he had ordered them to be destroyed, they should consider, also, that his was the greatest sacrifice, for they were his property,—all, indeed, he possessed in the world. The troops, on the other hand, would derive one great advantage from it, by the addition of a hundred ablebodied recruits, before required to man the vessels. But, even if the fleet had been saved, it could have been of little service in their present expedition; since they would not need it if they succeeded, while they would be too far in the interior to profit by it if they failed. He besought them to turn their thoughts in another direction. To be thus calculating chances and means of escape was unworthy of brave souls. They had set their hands to the work; to look back, as they advanced, would be their ruin. They had only to resume their former confidence in themselves and their general, and success was certain. "As for me," he concluded, "I have chosen my part. I will remain here, while there is one to bear me company. If there be any so craven as to shrink from

[21] "Decian, que los queria meter en el matadero." Gomara, Crónica, cap. 42.

[22] "Al cavo lo ovieron de sentir la gente y ayna se le amotinaran muchos, y esta fué uno de los peligros que pasaron por Cortés de muchos que para matallo de los mismos Españoles estuvo." Las Casas, Hist. de las Indias, MS., lib. 3, cap. 122.

sharing the dangers of our glorious enterprise, let them go home, in God's name. There is still one vessel left. Let them take that and return to Cuba. They can tell there how they deserted their commander and their comrades, and patiently wait till we return loaded with the spoils of the Aztecs."[23]

The politic orator had touched the right chord in the bosoms of the soldiers. As he spoke, their resentment gradually died away. The faded visions of future riches and glory, rekindled by his eloquence, again floated before their imaginations. The first shock over, they felt ashamed of their temporary distrust. The enthusiasm for their leader revived, for they felt that under his banner only they could hope for victory; and, as he concluded, they testified the revulsion of their feelings by making the air ring with their shouts, "To Mexico! to Mexico!"

The destruction of his fleet by Cortés is, perhaps, the most remarkable passage in the life of this remarkable man. History, indeed, affords examples of a similar expedient in emergencies somewhat similar; but none where the chances of success were so precarious and defeat would be so disastrous.[24] Had he failed, it might well seem an act of madness. Yet it was the fruit of deliberate calculation. He had set fortune, fame, life itself, all upon the cast, and must abide the issue. There was no alternative

[23] "Que ninguno seria tan cobarde y tan pusilánime que queria estimar su vida mas que la suya, ni de tan debil corazon que dudase de ir con él á México, donde tanto bien le estaba aparejado, y que si acaso se determinaba alguno de dejar de hacer este se podia ir bendito de Dios á Cuba en el navío que habia dexado, de que antes de mucho se arrepentiria, y pelaria las barbas, viendo la buena ventura que esperaba le sucederia." Ixtlilxochitl, Hist. Chich., MS., cap. 82.

[24] Perhaps the most remarkable of these examples is that of Julian, who, in his unfortunate Assyrian invasion, burnt the fleet which had carried him up the Tigris. The story is told by Gibbon, who shows very satisfactorily that the fleet would have proved a hindrance rather than a help to the emperor in his further progress. See History of the Decline and Fall, vol. ix. p. 177, of Milman's excellent edition.

in his mind but to succeed or perish. The measure he adopted greatly increased the chance of success. But to carry it into execution, in the face of an incensed and desperate soldiery, was an act of resolution that has few parallels in history.[25]

[25] The account given in the text of the destruction of the fleet is not that of Bernal Diaz, who states it to have been accomplished not only with the knowledge, but entire approbation of the army, though at the suggestion of Cortés. (Hist. de la Conquista, cap. 58.) This version is sanctioned by Dr. Robertson (History of America, vol. ii. pp. 253, 254). One should be very slow to depart from the honest record of the old soldier, especially when confirmed by the discriminating judgment of the Historian of America. But Cortés expressly declares in his letter to the emperor that he ordered the vessels to be sunk, without the knowledge of his men, from the apprehension that, if the means of escape were open, the timid and disaffected might at some future time avail themselves of them. (Rel. Seg. de Cortés, ap. Lorenzana, p. 41.) The cavaliers Montejo and Puertocarrero, on their visit to Spain, stated, in their depositions, that the general destroyed the fleet on information received from the pilots. (Declaraciones, MSS.) Narvaez in his accusation of Cortés, and Las Casas, speak of the act in terms of unqualified reprobation, charging him, moreover, with bribing the pilots to bore holes in the bottoms of the ships in order to disable them. (Demanda de Narvaez, MS.—Hist. de las Indias, MS.; lib. 3, cap. 122.) The same account of the transaction, though with a very different commentary as to its merits, is repeated by Oviedo (Hist. de las Ind., MS., lib. 33, cap. 2), Gomara (Crónica, cap. 42), and Peter Martyr (De Orbe Novo, dec. 5, cap. 1), all of whom had access to the best sources of information. The affair, so remarkable as the act of one individual, becomes absolutely incredible when considered as the result of so many independent wills. It is not improbable that Bernal Diaz, from his known devotion to the cause, may have been one of the few to whom Cortés confided his purpose. The veteran, in writing his narrative, many years after, may have mistaken a part for the whole, and in his zeal to secure to the army a full share of the glory of the expedition, too exclusively appropriated by the general (a great object, as he tells us, of his history), may have distributed among his comrades the credit of an exploit which, in this instance, at least, properly belonged to their commander. Whatever be the cause of the discrepancy, his solitary testimony can hardly be sustained against the weight of contemporary evidence from such competent sources.*

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* [Prescott's account of the circumstances attending the destruction of the fleet has been contested at great length by Señor Ramirez, who insists on accepting the statements of Bernal Diaz without qualification, and ascribing to the army an equal share with the general in the merit of the act. He remarks with truth that the language of Cortés—"Tuve manera, como so color que los dichos navíos no estaban para navegar, los eché á la

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10

American Airlines' Value Pricing (A)

At a press conference on April 9, 1992, Robert L. Crandall, chairman, president and CEO of American Airlines, the U.S.'s largest carrier, made the following statement:

> We have a major strategic announcement to make, one which recognizes a very fundamental truth: no industry and no company can afford to ignore change. . . . In the airline business, which is simply not working as it should, change is clearly needed. . . . We have said for some time that our yields[1] are too low, yet the conventional solution, higher and higher full fares and an ever-growing array of discount fares surrounded by an ever-changing plethora of restrictions, simply does not work. . . . In our unsuccessful pursuit of profits, we have made our pricing so complex that our customers neither understand it nor think it is fair. . . . We absolutely must find a way to bring value back to air travel. . . . By moving to a new approach, which emphasizes simplicity and equity and value, we hope to regain the good will of our customers. We think our new system is both logical and fair and because it offers our customers both lower prices and a greater flexibility that it represents great value. We call it Value Pricing. . . . It will give our customers a better deal, it will increase our revenues and it will help restore both American and the U.S. airline industry to profitability. Among its other virtues, our value plan will stimulate business travel and thus overall U.S. economic activity. Getting business travelers back in the air, selling, seeing their customers face to face, hunting up deals, will, in our view, do a lot to get our economy back on track.

Value pricing represented a radical simplification of the complex pricing structure which had evolved over more than a decade following deregulation of the industry. Instead of selling seats at a dozen or more different prices on any given flight, henceforth American would offer

Steven C. Michael and Alvin J. Silk prepared this case as the basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation. The authors are indebted to Robert Dolan for his valuable comments and suggestions.

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1. "Yield" is revenue from passenger fares per revenue passenger mile flown. A "revenue passenger mile" is one paying passenger flown one mile.

only four kinds of fares: first class, regular coach, and two discount coach fares requiring purchase of the ticket either 7 or 21 days in advance of departure. These changes would reduce the total number of different fares American maintained at any time for its total flight operations network from 500,000 to just 70,000. Furthermore, the plan lowered prices for both business and leisure travelers. First class fares were dropped 20-50% while regular coach fares were cut an average of 38%, with smaller reductions in advanced purchase discount fares.

Following the Crandall press conference, the burning question being asked throughout the industry was: What would be the fate of American's bold initiative?

Company Background

In 1992, American Airlines, Inc. was the largest airline in the United States. Its fleet of 622 jet aircraft flew 2,450 flights daily, serving 182 locations in the U.S. mainland and Hawaii, 14 in Europe, 38 in Latin America, plus 22 other destinations worldwide. American Airlines was the principal subsidiary of AMR Corporation, accounting for more than 90% of AMR's assets, operating revenues, and expenses.

In the period following deregulation of the domestic airlines industry in 1978, American underwent a transformation which enabled it to become the industry's market share leader and lowest cost operator among the major national carriers. A study of deregulation concluded: "In terms of strategy, organization structure, and performance, American Airlines, starting as the second largest but least efficient incumbent of domestic carriers, made the most thoroughgoing and successful adjustment to deregulation."[2]

Historically, American had pioneered several policies that ultimately affected the industry's basic structure and standard practices. In the late 1960's, American introduced the first computerized airline reservation system, SABRE, a major innovation in information systems that revolutionized marketing and distribution in the travel industry. At about the same time, it began developing the concepts of yield management, laying the foundation for what would evolve over the next two decades into a highly sophisticated and automated system for managing flight reservations as a perishable inventory.[3] American's introduction of "Super Saver" fares in 1977 represented the first program of deep discounts offered to leisure travelers. And in 1981, American launched the first frequent-flier program, a form of promotion which proved highly successful in encouraging brand loyalty to an airline by offering a bonus to customers for accumulating miles on its system.

Robert L. Crandall led American Airlines through most of the turbulent period following deregulation. Crandall joined the company in 1973 as vice-president of finance. Previously, he had worked in finance at Eastman Kodak and Hallmark Cards and gained experience in control and information systems. When Crandall was named president and COO in June 1980, American was incurring heavy operating losses while adjusting to the newly created competitive

2. Richard H. K. Vietor, "Contrived Competition: Airline Regulation and Deregulation, 1925-1988," *Business History Review* 64 (Spring 1990): 86.
3. Barry C. Smith, John Leimkuhler, and Ross M. Darrow, "Yield Management at American Airlines," *Interfaces* 22 (January-February 1992): 8-31.

environment. Crandall immediately embarked on a restructuring program that restored the firm to profitability by combining highly efficient operations with effective marketing. Having championed several of American's innovations, Crandall acquired the reputation for being both the industry's "fiercest competitor" and its leading "visionary." Colleagues described him as someone who characteristically "[is] thoroughly prepared, bulldog aggressive, and loves nothing more than vigorous debate."[4]

Given its high fixed cost structure, the airlines industry was sensitive to economic downturns. Thus 1990 and 1991 were difficult years for both American and the airline industry as a whole. As a result of a recession and the Gulf War, demand for air travel fell off in 1991, fare wars set in, and the airlines incurred massive losses. The industry's cumulative losses, $1.87 billion in 1991 alone, exceeded the total amount of profits the industry had ever earned throughout its 60 year history. American itself reported losses of $77 million in 1990 and $165 million in 1991. Eastern, Midway, and Pan Am ceased operations. By the first quarter of 1992, America West, Continental, and TWA, collectively representing 20% of industry capacity, had been forced to file for protection under Chapter 11 of the Bankruptcy Code. Industry volume, capacity utilization, and profitability for the period 1978-91 are shown in **Exhibit 1.** Operating results for major domestic U.S. carriers appear in **Exhibit 2** for the years 1989-91.

American Airlines' major domestic competitors were United Airlines and Delta Airlines. Both operated airlines with similar scope and service to American. In addition, a host of smaller firms competed as well. USAir served primarily eastern and southeastern markets. America West and Southwest were discount carriers serving the Southwest and California. TWA offered primarily coast-to-coast service through its hub in St. Louis. Flying primarily east-to-west, Northwest served the northern tier of the United States, while Continental served the southern tier.

Deregulation of the Domestic Airlines Industry

In 1938, Congress created the Civil Aeronautics Board (CAB) to foster "the sound development of an air transportation system."[5] The CAB had broad authority to control entry, exit, prices and methods of competition. Individual air carriers sought differentiation through such factors as the frequency with which flights on a given route were scheduled, and by emphasizing amenities and services offered.

By the late 1970s, the regulatory structure was deemed inefficient. Particularly striking were the comparisons between intrastate and interstate routes of similar length. For example, fares between Los Angeles and San Francisco (an unregulated intrastate market) were about half fares from Chicago to Minneapolis (a regulated interstate market). In addition, the general stagflation of the 1970s and the worldwide rise in oil prices made transportation efficiency a national concern. Meanwhile, economic analyses emphasized the potential gains from deregulation. In 1978, Congress passed the Airline Deregulation Act. As expected, competition intensified, prices fell, with the largest reductions occurring in long-haul, coast-to-coast routes,

4. "Dogfight: United and American Battle for Global Supremacy," *Business Week*, January 21, 1991, pp. 58.

5. See Vietor, *op. cit.*, pp. 68.

and the number of people traveling increased substantially.[6] Between 1980 and 1990, passenger volume grew by almost 80%, the equivalent of a compound annual growth rate of 6%.

Many new carriers now entered the industry, including Jet America, Air One, New York Air, People Express, America West, and Midway. Regional airlines (USAir, Piedmont, Ozark, Western, Frontier, and Republic) saw deregulation as an opportunity to expand. Older national carriers such as American, United, Delta, Eastern, Braniff, Continental, TWA, Pan Am, and Northwest, sought ways to respond. Such features of the airline industry as frequent flyer programs, hub and spoke operations, and restricted fares (all described below) were developed.

By 1986, competition took its toll, and a wave of mergers commenced. Twelve major mergers occurred between 1986 and 1989, as carriers scrambled to consolidate into truly national operations. The combined market share of the four largest airlines rose from 54.2% in 1982 to 64.8% in 1987. **Exhibit 3** shows the incidence of entry, exit, and consolidation in the U.S. airline industry since deregulation.[7]

Demand for Air Travel

In 1991, 76% of American adults reported that they had flown at some time in their lives and 32% had flown in the past year. **Exhibit 4** summarizes surveys indicating that over time, the incidence of travel for pleasure relative to that for business was increasing.

Price was considered the major determinant of demand for air travel. During the 1980s, airfares, in real terms, declined. A special committee appointed by the National Research Council to review the industry's experience under deregulation concluded, "After adjustments are made for inflation, the average passenger yield (fare divided by miles traveled) fell by about 15% between 1979 and 1989. This decline occurred despite several external events that caused sharp increases in airline costs, which probably would have resulted in even higher fares had the previous system of fare and route regulation continued."[8] The largest components of airline operating costs were labor and fuel expenses, with the latter varying widely in the 1980s. **Exhibit 5** summarizes trends in airline prices and costs. **Exhibit 6** compares trends in indices of air fares and consumer prices.

Despite this decline of airfares in real economic terms, there was substantial consumer dissatisfaction with airline prices (see **Exhibit** 7). Consumer perceptions were affected by the greater dispersion of airfares. In 1989, only 49% of passengers paid fares between 50% and 150% of the industry average, as compared to 63% in that range during 1979. However, fully

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6. See Severin Borenstein, "The Evolution of U.S. Airline Competition," *Journal of Economic Perspectives*, 6 (Spring 1992): 45-73.

7. Unlike the domestic U.S. airline industry, competition in international markets remained regulated through various bilateral agreements between the United States and other countries. By limiting access of one nation's carriers to another country's markets, these agreements effectively controlled the capacity available on international flights. The agreements varied considerably in their restrictiveness. See, for example, "European Airlines Winged," *Economist*, October 2, 1993, pp. 73-74

8. Transportation Research Board National Research Council, *Winds of Change: Domestic Air Transport Since Deregulation* (Washington, DC: Transportation Research Board National Research Council, 1991), Transportation Research Board Special Report 230, pp. 129.

20% of passengers paid less than 50% of the industry average fare in 1989, compared to only 5% in 1979. Furthermore, passengers paying more than 250% of average fare constituted 25% of the total in 1989, compared to 19% in 1979.[9]

It was estimated that about half of leisure travelers and one quarter of business travelers did not have a preference for any particular airline.[10] Apart from price and flight schedules, few other factors were deemed important in competing for travelers. In 1991, Robert Crandall summarized American's view: "Years of experience and lots of research have taught us that our customers prefer two things above all else: first, low prices, and second, frequent service and lots of time-of-day choices. Unhappily, greater comfort does not seem to be as important as other product features in attracting preferential patronage."[11]

The success of Southwest Airlines underscored the importance of bargain fares and a no-frills approach to service. Southwest, the seventh largest U.S. carrier, operated in only 15 states, serving local, short-haul markets. With an average flight of about one hour, Southwest emphasized low fares, high-frequency, and on-time service. It shunned many of the amenities normally associated with air travel, e.g., no assigned seating, meal service, or luggage transfer to other airlines. Southwest sought to "dignify the customer" in other ways, such as by sending birthday cards to frequent fliers and by responding to letters from customers with a personal response rather than a form letter. This strategy along with a highly motivated work force enabled Southwest to operate with the lowest costs in the industry and to remain consistently profitable for almost two decades. **Exhibit 8** reports findings from a survey of customers' perceptions of airline service quality. Customer satisfaction was also reflected in complaints travelers registered (see **Exhibit 9**).

Demand for air travel varied by season, weekday, and hour, reflecting the differential requirements of the two basic segments of the airlines' customer base: business and pleasure or leisure travelers. Pleasure travel tended to be discretionary, highly seasonal, peaking at holiday and vacation periods, but adaptable with respect to day and/or hour of departure. In contrast, business travel tended to be of shorter duration, less seasonal and less flexible in terms of accommodating to weekday and hourly scheduling options. Accordingly, the demand for discretionary pleasure travel was generally presumed to be more price-sensitive than that for time-dependent business travel.

A measure of the price responsiveness is the price elasticity of demand which is formally defined as the magnitude of the percentage change in quantity of demand for a good or service associated with a 1% change in the price of that good or service. Transportation analysts generally believed that demand for business air travel was less elastic than that for leisure or pleasure travel. Empirical estimates of price elasticity for air travel tended to confirm this expectation. A 1992 review of the published evidence found that the majority of estimates were in the range of -.8 and -2.0, with the elasticity for business travel generally being less than unity, while that for pleasure travel typically exceeded unity.[12]

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9. *Ibid.*, pp. 93-94.
10. *Ibid.*, pp. 146
11. Robert L. Crandall, "Why Not More Space?" *American Way*, September 1, 1991, pp. 10.
12. See: T. H. Oum, W. G. Waters, II, and J. Yong, "Concepts of Price Elasticities of Transport Demand and Recent Empirical Estimates," *Journal of Transport Economy and Policy* (May 1992): 149-150.

Historically, demand for air travel also tended to vary with the business cycle. Thus, during the late 1980s, with the downturn in the U.S. economy, the dollar volume of pleasure travel grew only 8% in the 1989-91 period compared to 19% for 1987-89. The comparable figures for business travel were a 9% increase for 1989-91 in contrast to the 28% growth experienced in 1987-89.[13]

As economic conditions tightened, corporate travel managers in large firms monitored their travel agencies and audited employees' expense accounts in an effort to reduce expenses and eliminate unnecessary travel. At the same time, the threat of competition from technological substitutes for business air travel began to emerge with the growing availability of teleconferencing and video conferencing.[14] Nevertheless, in 1992 business travelers continued to account for almost half of the industry's volume (revenue passenger miles) and approximately 60% of its revenues.[15]

Competitive Marketing Strategies

Deregulation spurred marked changes in airlines' competitive strategies and tactics. Among the most significant developments were the widespread utilization of computer reservation systems (CRSs), hub and spoke flight networks, and frequent flier programs.[16]

Computerized Reservation Systems

CRSs played an integral role in the marketing and distribution system in the airline industry. CRSs store information on flights, seat availability, and fares and process millions of bookings daily. In 1992, 92% of all domestic reservations were handled through one of the four major CRSs operating in the United States. These systems process and store fare and flight information pertaining to the operations of all the domestic carriers except Southwest. In 1992, 90% of travel agents used only one of the four systems. The first CRS introduced, American's SABRE, remained the largest. The ownership of the second largest system, APOLLO, was split between United Airlines (50.1%) and a consortium including USAir and several foreign carriers. In 1988, SABRE had a 43.1% share of domestic bookings and APOLLO's had 27.9%. By 1991, SABRE was installed in 14,000 locations throughout the United States.

While vital to the efficiency of travel markets, CRSs generated controversy over the years. Initial complaints concerned "screen bias"— the practice of the airline owning the CRS listing its flights more prominently than those of their competitors. Federal regulations introduced in 1984 prohibited this practice.

CRS sytems offered their owners other important sources of competitive advantage. First, booking fees charged by CRSs enabled the owner to earn substantial amounts of revenues from its competitors. Second, data bases were a valuable resource for yield management systems which enabled an airline to control its prices and seat inventory in a timely and sophisticated manner.

13. Transportation Research Board and National Research Council, *op. cit.*, p. 129.
14. See: Lewis Lazare, "Air Fares More Fair for Some," *Business Marketing* (August 1992), pp. 21-22.
15. Kenneth Labich, "What Will Save the U.S. Airlines," *Fortune*, Vol. 127, June 14, 1993, pp. 100.
16. See: Transportation Research Board National Research Council, *op. cit.*, pp. 145-163 and 285-292.

Finally, the owner of a CRS could benefit from a "halo effect" or the tendency for agents to favor the carrier who owned the CRS they used in booking reservations.

Hubbing

Hub and spoke operations offered benefits to both carriers and consumers. With "hubbing," a carrier replaced non-stop flights with a set of connecting flights: flights from various origins on spokes of the network were channelled through an intermediate location, or hub, where they changed planes and were re-routed to their desired final destinations on other spokes of the network. Thus, the airline could serve more locations with fewer planes and consumers located in less heavily travelled markets obtained more convenient services than would otherwise have been available. The costs, however, were the additional time spent changing planes and the added risk of delays, missed connections, lost luggage, etc.

A carrier tended to enjoy a marketing advantage in attracting passengers who originated their trips at the airport which served as the carrier's hub. Dominance of a hub by one or two airlines affected fares and profitability (see **Exhibit 10**). In 1992, American's hubs were Dallas, Chicago, Nashville, San Juan, San Jose, and Raleigh-Durham.

Frequent Flyer Programs

Frequent flyer programs (FFPs) provided an incentive to fly a particular airline. The value of the bonuses increased as mileage flown accumulated and included fare reductions, upgrades to better classes of service, and free tickets. Since approximately 5-6% of fliers accounted for roughly 40% of trips taken each year, FFPs held a special appeal to business travelers. Estimates from a survey of travel agents indicated that approximately 80% of business travelers picked airlines in order to be able to accumulate frequent flier credit on at least half of their trips.[17] When American introduced the frequent flyer program in 1981, many in the airline industry downplayed the concept as a mere gimmick. Soon, however, all the major carriers except Southwest offered a frequent flyer program and many travelers participated in the programs of several carriers.

Distribution System

The dominant distribution channel for air travel was the travel agent, who aided travelers in choosing carriers, fares, and supplementary services, such as hotels and car rentals. In 1991, about 85% of all air travel was booked through travel agents, up from 50% in 1985. Revenue for travel agents reached $80 billion in 1990, a rise of 24% over 1987; air travel represented about 56% of that sum. The number of travel agents rose from 14,804 in 1978 to 30,373 in 1990.[18]

Business travelers and pleasure travelers demanded different service since business travelers knew their destination. Virtually all firms that used travel agencies asked the agents to

17. *Ibid.*, p. 154.
18. "U.S. Travel Agency Survey," *Travel Weekly*, Vol. 51, No. 65, August 13, 1992, pp. 13-17.

make reservations and deliver tickets. Agents were also expected to monitor and enforce corporate travel policy. Pleasure travelers required more counseling; for example, agents frequently suggested destinations. About 45% knew precisely where they wanted to go, 35% had a destination in mind, and 20% had no idea.[19] Once a destination was chosen, the agent combined air, hotel, local transport, and local touring into a package.

The largest travel agencies specialized in business travel, but 90% of agencies handled at least one corporate account. The average number of accounts handled was 38. Of those accounts, 72% were firms with less than 100 employees, 21% were firms with between 100 and 1,000 employees, and 7% were firms with more than 1,000 employees.[20]

Agents were compensated through commissions from ticket sales. Most airlines utilized commission rate structures that offered higher commissions with increases in the share of the agent's ticket volume going to a particular carrier—known as "travel agent commission overrides" or TACOs.[21] The typical TACO or bonus was reported to be about 2% of ticket revenues and the average agent commission for booking a ticket was 8-10%.[22] Thus agents had an incentive to influence their customer's choice of carrier. Few airline ticket buyers were aware of TACOs. Within the industry, it was generally believed that agents were most affected by the TACO program of the dominant carrier within a given geographical market.[23]

Airlines also offered quantity discounts directly to large corporate buyers. These discounts were the subject of negotiations, and one industry source reported that in 1990, two-thirds of the "big companies" surveyed had obtained discounts of 35-45% off "full fare."[24]

Frequent flyer programs were well received by business travelers, who obtained the benefits from the bonuses even though typically it was an employer, rather than the traveler, who paid the fare. Indeed, studies showed that many corporate travel managers believed that frequent flyer programs brought about higher air fares than would otherwise have persisted. Businesses sometimes imposed controls on air travel to assure employees selected the lowest fares and occasionally firms had attempted to reclaim the benefits from frequent flyer programs for the organizations involved.[25]

Pricing in the Airline Industry

Airline pricing practices changed dramatically in the wake of deregulation. Free from controls, carriers were able to set prices in a manner that gave explicit recognition to the heterogeneity of consumers' preferences for air travel and their sensitivity to prices and restrictions. Airline pricing involves decisions in two key areas: (a) fare structure and restrictions, and (b) yield management.

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19. Marilee Crocker, "U.S. Travel Agency Survey," *Travel Weekly*, Vol. 49, June 28, 1990, pp. 40-45.
20. "U.S. Travel Agency Survey," *Travel Weekly*, Vol. 51, No. 65, August 13, 1992, pp. 45-46.
21. Borenstein, *op. cit.*, pp. 62-63.
22. Transportation Research Board National Research Council, *op. cit.*, pp. 286-287.
23. Transportation Research Board National Research Council, *op. cit.*, pp. 152-153.
24. Julie Schmit, "Airfares Leave Corporate Clients Cold," *USA Today*, July 16, 1992, pp. 2B.
25. Transportation Research Board National Research Council, *op. cit.*, pp. 154-155.

A fare structure was formulated by defining different classes of fares (e.g., first, business, coach) and setting the levels of fares for each class. Following deregulation, the practice of offering a wide variety of fares discounted below the "regular" coach fare became commonplace. These discount fares were accompanied by various restrictions (e.g., advance purchase requirements, cancellation penalties, minimum stay conditions, schedule limitations), intended to smooth demand and/or reduce unused capacity by separating price-sensitive discretionary travelers (pleasure segment) from time-sensitive passengers (business segment). An example was the Saturday stayover, whereby those unable or unwilling to meet this restriction paid a higher fare than those who fulfill it.

Some customers devised creative ways to circumvent unwanted requirements and save money, e.g., "back-to-back ticketing."[26] At one point the round trip fare for a Columbus-Las Vegas trip without a Saturday night stay was $1,096, but it was possible to purchase two round trip tickets, both carrying the Saturday night restriction, for $396 each (total $792). Thus, by actually flying only one leg on each ticket, the traveler could both avoid the stayover restriction and spend less.

At American Airlines, yield management was viewed as "selling the right seats to the right customers at the right prices."[27] As Barbara Amster, American's vice- president for pricing and yield management put it, "I have to see how many people I can get to give me the most money."[28] For an airline, yield management was the functional equivalent of inventory control in a manufacturing firm and encompassed three tasks: establishing overbooking policy, discount fare allocation, and traffic management.

Overbooking meant deliberately selling more seats on a flight than were actually available. This policy compensated for passenger cancellations and no-shows, which averaged about 50% of all flight reservations. Even on flights that were sold out, American estimated that 15% of seats would be unfilled in the absence of overbooking. But overbooking also carried the risk of incurring a cost. If the number of ticketed passengers who showed up exceeded the flight's capacity, then the airline had to re-route and compensate the inconvenienced passengers. Hence, for each flight, the carrier had to set the level of overbooking so as to balance the expected revenue gained from filling an additional seat against the expected cost of overbooking.

If all passengers on a flight paid the same fare, then overbooking would be an efficient means of achieving the goals of yield management. However, the problem was complicated by discount fares and multiple types of fares. If a passenger inquired about whether a certain discounted fare was available on some particular flight, the airline had to weigh the odds of selling an additional full fare seat later against the certainty of selling the discounted fare then. Since the probabilities affecting these tradeoffs shifted as the time of the flight approached, these calculations had to be continually updated. Thus, it was necessary to formalize a *discount allocation* process to determine the number of discount fares to be offered on each flight.

Given the operations of a hub and spoke system, any given flight might include passengers with dozens of fares and destinations. Upwards of two-thirds of passengers on a typical flight arriving in a hub airport were connecting to another flight to reach their final destination. If

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26. Asra Q. Nomani, "Booking Ploys Reap Bargains for Fliers," *Wall Street Journal*, April 9, 1992, pp. B1.
27. Smith, Leimkuhler, and Darrow, *op. cit.*, p. 8.
28. Quoted in: Louis Uchitelle, "Off Course," *New York Times Magazine*, September 1, 1991, pp. 12.

revenues were to be maximized across the entire system of flights, then the imposition of controls on reservations for any single flight had to take into account passenger demand on connecting flights. Hence, *traffic management* consisted of the process of controlling reservations by passenger destination and origin in order to provide the mix of markets (single-flight vs. multiple-flight connecting markets) that maximized revenues.

The operation of the yield management system sketched above required a massive data base stored in a powerful computer system where it could be continually updated to support a variety of complex models and optimization methods. In addition to serving reservation and travel agents, American's SABRE also provided the data base and information systems support required to run the models and control implementation of the fare changes.

Through an ongoing program of investment and research, American pioneered the use of sophisticated models in this field and by 1988 had fully implemented an automated decision-making system for yield management. Crandall commented on the strategic value of these systems:

> The development of yield management was a key to American Airline's survival in the post deregulation environment . . . . We estimate that yield management has generated $1.4 billion in incremental revenue in the last three years alone. This is not a one-time benefit. We expect yield management to generate at least $500 million annually for the foreseeable future.[29]

By 1991, the industry's pricing structure had become enormously complex. American's operations alone involved 2,450 jet departures daily and each flight averaged 12 or more published fares whose availabilities were constantly being revised. American's own flights involved maintaining over 500,000 fares. The fare structures of other airlines were equally complex. The combined total for the entire industry was 5 million fares, and a million or more fare changes might be made overnight. The power of yield management systems clearly contributed to the proliferation of fare discounts in the industry. Mike Gunn, American's senior vice-president for marketing observed:

> The growing array of fares meant an ever-increasing percentage of American's and the industry's tickets were being sold at deeper and deeper discounts. By late 1991, 93% of our tickets were sold at one kind of a discount or another. The maximum discount was 78% and the average discount was 63%.[30]

American's "Value Pricing" Plan

In announcing American's "Value Pricing" plan, Crandall stressed the "simplicity, equity, and value" of the new structure compared to the existing system with its multitude of ever-changing fares, discounts, and restrictions.

29. Quoted in: Smith, Leimkuhler, and Darrow, *op. cit.*, pp. 31.
30. Quoted in: "Carrier Executives Share Successful Promotional Strategies," *Travel Weekly*, 51, September 14, 1992, pp. 26.

American's new fare structure embodied three key design concepts. First, on any given flight, there would be only four different fares. The levels of the different types of fares were established so as to bear a set relationship with one another as illustrated below:

Level	Fare Type
Highest	- First Class
↑	- Regular Coach
	- Discount Coach: 7-Day Advanced Purchase
Lowest	- Discount Coach: 21-Day Advanced Purchase

The second key aspect of the new structure was that all fares were to be mileage-related— i.e., fares for different flights connecting disparate points would vary according to actual distances flown. Finally, the new fares were set below the levels of the comparable existing fares and thus lower prices would be available to more business and leisure travelers.

The essential features of the new coach class fares are summarized below:[31]

Regular Coach: AAnytime Fare

- No restrictions.
- Available on all flights, every day.
- New fares set at least 38% below the existing unrestricted or full coach fare.

Discount Coach: PlanAAhead Fares

- Saturday night stayover required.
- Advance purchase of 21 days.[32]
- New PlanAAhead fares set as much as 49% below the new regular or full coach (AAnytime) fares
- All special discounts were to be eliminated, including those previously available for conventions, corporations, and the military.

Refund Policy

- New $25 charge for the refund or reissue of any ticket, with $5 passed on to travel agents.

31. The new structure also affected first class fares which were reduced by at least 20% and in certain instances, by as much as 50%.

32. Value Plan also included a discount fare with a 7-day advanced purchase requirement. The 7-day fare was $30-$60 higher than the 21-day fare, depending on the length of the flight.

Refund Policy

- New $25 charge for the refund or reissue of any ticket, with $5 passed on to travel agents.
- Regular coach tickets were refundable.
- Discount coach tickets were not refundable but they could be re-issued for another flight, provided the discount restrictions were met.

Table A compares various existing coach fares with the new Value Plan fares for a set of routes flown by American.

Table A Comparison of Existing And Value Plan Round Trip Coach Fares[33]

Route	Regular		Discount		
	Old	New	Old		New
			30 Day*	21 Day	21 Day
New York-Chicago	$854	$500	$338	$355	$260
New York-Los Angeles	1,504	920	398	549	460
Dallas-Boston	1,310	760	418	467	390
Dallas-Denver	780	480	298	345	240
Dallas-Seattle	1,264	760	418	467	390

*The 30 day excursion fare was to be dropped after the introduction of the new fare structure.

By setting fares so that their levels reflected distances flown and by eliminating all previous "special" discounts, American intended Value Plan to be a "logical and fair" structure as well as a simple one. Referring to the reduction in the level of regular coach fares, Crandall explained that the AAnytime fare "is intended to be a market-clearing fare, that is about the level at which the deepest corporate discounts out there are today and that's essentially how we got to the 38% figure." He went on to suggest that "special deals will no longer be needed because the AAnytime fare is both low and flexible and because Plan AAhead fares will be lower still and the same prices will be available to everyone."

American planned to spend $20 million on media time and space over a two-week period to promote the new fare structure. The nationwide campaign was to run on radio and television and in newspapers. An example of one of the ads run in newspapers such as the *Los Angeles Times*, the *New York Times*, and the *Wall Street Journal* is shown in **Exhibit 11.**

Regarding the effects of the new policy, American anticipated that its revenues for the second quarter of 1992 would be adversely affected by as much as $100 million. However, for the year as a whole, the revenue impact was expected to be positive and remain so in the longer term, with $300-350 million of additional revenues being generated annually.

33. *New York Times*, April 10, 1992, pp. 1.

In the short-term, revenues would be "diluted" because some customers who would now purchase the new AAnytime fare would have otherwise paid the higher existing full coach tariff. However, American judged that this dilution would be short-lived. In explaining the "economics of value pricing," Crandall noted that "we expect yield to remain flat and volume to increase," adding that "the positive revenue implications are driven primarily by the assumption of incremental business." Four effects were identified as the sources of the longer-term gains foreseen by American:

(i) shifts in the mix of regular and discount fares. American expected that about a third of its traffic would travel on AAnytime fares.

(ii) a change in American's market share. American anticipated capturing an additional one half of 1% of the total U.S. market.

(iii) generation of new business, especially from business travelers. One source reported that previously total passenger traffic had been forecast to grow by only about 2% in 1992 over 1991, under the assumption of continued slow growth in the economy. However, with the introduction of American's new pricing structure, a 3-4% increase was projected.[34]

(iv) Cost savings of $25 million per year were predicted as a result of the reduction in the number of fares American would offer and maintain in its CRS from 500,000 to only 70,000.

At the time of the announcement, Crandall pointed out that Value Plan was not "a promotion":

> I . . . emphasize that although we will always be price competitive, this fare structure is permanent. We are going to leave this fare structure in place because we think this is the right way to put value back in air travel. If we have to be competitive, we will simply move the structure.

After completing his presentation, Robert Crandall invited questions from the assembled audience of business journalists and industry experts. The opening questioner asked: what has to happen in order for this to work?

34. Edwin McDowell, "American Air Cuts Most Fares in Simplification of Rate System," *New York Times*, April 10, 1992, pp. C3.

Exhibit 1 U.S. Airline Industry Operating Results: 1978-1991[a]

	(1) Revenue Passenger Miles[b] (billions)	(2) Available Seat Miles (billions)	(1) ÷ (2) Load Factor	(3) Operating Revenue[c] ($ billions)	(4) Operating Expense[c] ($ billions)	{((3) - (4)) / (3)} *100 Operating Margin (%)	Yield[d]	(4) ÷ (2) Cost per Available Seat Mile
1978	226.781	368.751	0.6150	$22.884	$21.519	5.96	0.083	$0.058
1979	262.023	416.126	0.6297	27.227	27.028	0.73	0.087	0.065
1980	255.192	432.535	0.5900	33.728	33.949	-0.66	0.110	0.078
1981	248.888	424.897	0.5858	36.663	37.117	-1.24	0.123	0.087
1982	259.644	440.119	0.5899	36.408	37.141	-2.01	0.118	0.084
1983	281.829	464.538	0.6067	38.954	38.643	0.80	0.116	0.083
1984	305.116	515.323	0.5921	43.825	41.674	4.91	0.121	0.081
1985	336.403	547.788	0.6141	46.664	45.238	3.06	0.117	0.083
1986	366.546	607.436	0.6034	50.525	49.202	2.62	0.109	0.081
1987	404.472	648.721	0.6235	56.986	54.517	4.33	0.111	0.084
1988	423.302	676.802	0.6254	64.572	61.115	5.35	0.119	0.090
1989	432.714	684.376	0.6323	69.315	67.505	2.61	0.124	0.099
1990	457.926	733.375	0.6244	76.142	78.054	-2.51	0.128	0.106
1991	447.796	714.974	0.6263	75.114	76.837	-2.29	0.127	0.107

Source: *Air Transport 1992* and earlier years. Washington, D.C.: Air Transport Association, June, 1992. p. 3.

[a]The results cover both domestic and international operations of all commercial U.S. airlines offering scheduled domestic passenger service.

[b]A revenue passenger mile is one paying passenger, flown one mile.

[c]Operating Revenues and Operating Expenses are totals for passenger, freight, express, mail, and charter operations.

[d]Yield: Passenger Operating Revenue per Revenue Passenger Miles.

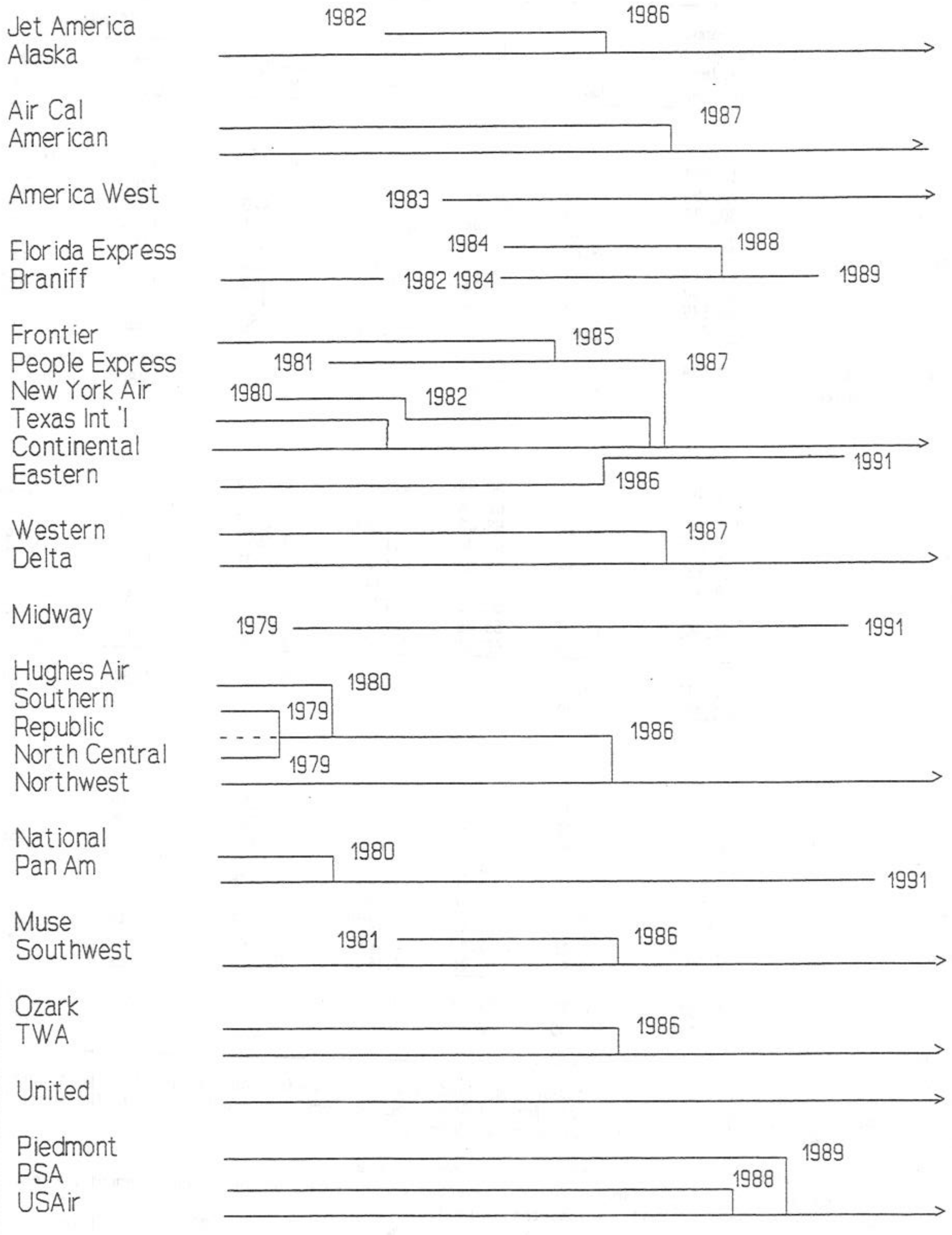
Exhibit 2 Domestic Operating Results of Major U.S. Airlines: 1989-1991[a]

	Revenue Passenger Miles (millions)	Market Share	Load Factor (%)	Yield	Oper. Exp. Per Revenue Passenger Mile	($ millions) Operating Income[b] (Loss)	Net Income[b] (Loss)
1991							
America West	12,637	3.80	64.94	0.1025	0.1184	($102)	($206)
American	63,667	19.15	60.86	0.1283	0.1357	667	(253)
Continental	30,122	9.06	61.80	0.1172	0.1470	(397)	(1,550)
Delta	56,566	17.02	59.95	0.1375	0.1511	(281)	(216)
Northwest	30,724	9.24	62.90	0.1278	0.1425	(48)	10
Southwest	11,274	3.39	61.14	0.1082	0.1089	36	14
TWA	18,090	5.44	60.94	0.1148	0.1535	(283)	(86)
United	56,579	17.02	64.23	0.1221	0.1451	(359)	(175)
USAir	32,880	9.89	58.22	0.1690	0.1958	(561)	(489)
Total All Majors[c]	318,624	95.85	61.40	0.1310	0.1634	(116)	(3,511)
Total All Scheduled Airlines[d]	332,407	100.00	60.42			(480)	(1,226)
1990							
America West	11,063	3.25	60.99	0.1114	0.1223	(31)	(77)
American	63,242	18.59	61.48	0.1296	0.1439	103	(40)
Continental	28,266	8.31	58.42	0.1248	0.1495	(191)	(1,218)
Delta	50,879	14.95	57.98	0.1421	0.1547	(176)	(119)
Northwest	29,522	8.68	62.53	0.1324	0.1501	(132)	(27)
Southwest	9,972	2.93	60.60	0.1148	0.1108	82	47
TWA	19,990	5.88	58.90	0.1234	0.1507	(134)	(221)
United	54,968	16.16	63.85	0.1271	0.1452	(34)	73
USAir	34,542	10.15	59.54	0.1637	0.1888	(562)	(410)
Total All Majors[c]	325,119	95.56	60.62	0.1320	0.1667	(880)	(3,183)
Total All Scheduled Airlines[d]	340,231	100.00	1.17			(988)	(3,351)
1989							
America West	7,802	2.36	57.69	0.1184	0.1218	46	13
American	62,767	19.02	63.63	0.1227	0.1269	708	412
Continental	28,427	8.61	60.34	0.1204	0.1327	124	(56)
Delta	52,392	15.88	63.55	0.1391	0.1356	677	467
Northwest	27,015	8.21	60.88	0.1302	0.1438	58	116
Southwest	9,279	2.81	62.75	0.1049	0.0989	97	71
TWA	20,943	6.35	59.42	0.1221	0.1389	10	(179)
United	54,149	16.41	65.43	0.1218	0.1322	302	246
USAir	24,878	7.54	61.20	0.1583	0.1769	(240)	(145)
Total All Majors[c]	312,626	94.74	62.43	0.1293	0.1533	1,742	493
Total All Scheduled Airlines[d]	329,975	100.00	62.25			1,854	397

Source: Results for individual carriers are taken from Standard and Poor's *Airospace and Air Transport*, Industry Surveys, June 25, 1992, p. A38. Data on "Totals for All Scheduled Carriers" are reported in *Air Transport 1992*. Washington, DC: Air Transport Association of America, June, 1992, pp. 12 and 17.

[a]Results cover only domestic operations, international operations are excluded.
[b]Operating revenue and net income reflect operating revenues and expenses to operating revenues and expenses for passenger, freight, express, mail, and charter operations.
[c]A major carrier is one with annual revenues of $1 billion or more. As of July, 1991, the Department of Transportation classified 12 of 66 commercial U.S. air carriers as "majors."
[d]Totals include carriers not listed separately in table.

Exhibit 3 Entry, Exit, and Consolidation of Large U.S. Airlines Since Deregulation



Source: Severin Borenstein, "The Evolution of U.S. Airline Competition," Journal of Economic Perspectives, 6 (Spring 1992), p. 48.

Exhibit 4 Trends in the Utilization of Air Travel

Percentage of American adults who have:	1981	1989	1990	1991
...ever flown?	65%	78%	74%	76%
...flown in the last 12 months?	24	34	31	32
Percent traveling on:				
Business	52	51%	48%	46%
Pleasure	48	49	52	54

Source: Air Travel Survey, Air Transport Association and Gallup Organization, reported in *Air Transport 1992*, The Annual Report of the U.S. Scheduled Airline Industry. Washington, DC: Air Transport Society of America, June, 1992, p. 10.

Exhibit 5 Indices of Components of Airline Costs

Index of Costs Over Time

	1985	1988	1989	1990
Composite	313.4	310.0	329.6	353.2
Labor	277.8	286.6	295.4	301.1
Interest on debt	198.8	187.9	210.2	202.3
Fuel	689.6	457.7	515.0	658.7
Passenger food	167.0	182.3	199.9	215.0
Advertising and promotion	203.3	197.2	218.0	221.7
Landing fees	217.6	276.8	294.0	316.7
Commissions on passenger traffic	491.4	619.0	679.0	733.4
All other	239.2	260.9	271.8	282.8

Cost index, with 1972 = 100.

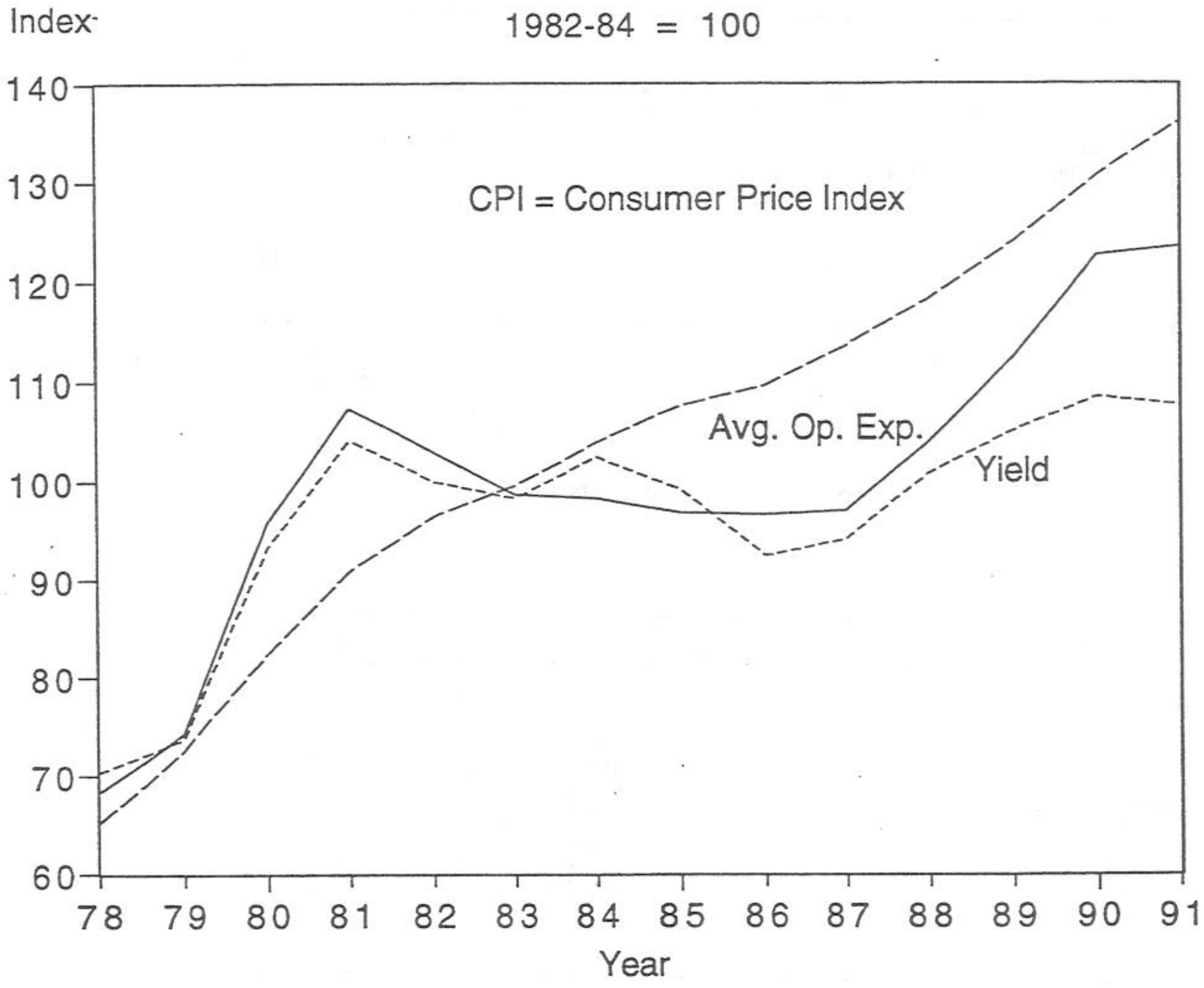
Distribution of Cash Operating Expenses*

	1985	1990
	%	%
Labor	34.9	32.5
Interest on debt	3.5	2.5
Fuel	22.3	17.6
Passenger food	3.2	3.6
Advertising and promotion	2.3	2.1
Landing fees	1.7	1.9
Commissions on passenger traffic	7.4	9.7
All other	24.6	30.1
Total	100.0	100.0

*"Cash Operating Expenses" are defined as total operating expenses plus interest on long term debt less depreciation and amortization.

Source: *Statistical Abstract of the United States*, 1992, Table 1039, p. 626.

Exhibit 6 Indices of Airline Industry Yield, Average Operating Expense, and CPI



Sources: The indices for Yield and Average Operating Expense per Passenger Revenue Mile were computed from the data on these two series shown in Exhibit 1. Data on CPI was obtained from *Statistical Abstract* of the United States, 1992, Table 738, p. 469.

Exhibit 7 1989 Survey of Customer Satisfaction with the Airlines Industry

	Yes	No
Are airlines prices rising because airlines are getting greedy?	44%	52%
Were cheap airfares of the mid-1980s too good to last?	75	22
Are fares going up because mergers have decreased competition?	73	23
Are airlines raising their fares because their costs are going up?	58	40

Ten years later, how do you feel about deregulation?

It was a good idea:	32%
It was a bad idea:	23
It didn't make a difference:	35

Source: Adapted from surveys by *Business Week* and *Time* as reported in Nancy Donohue and Pankaj Ghemawat, "The U.S. Airline Industry, 1978-1988 (A)," HBS Case No. 390-025, 1989, p. 20.

Exhibit 8 Ratings of Domestic Airlines on Service Quality[a]

	Delta	American	Southwest	America West	United	Northwest	USAir	TWA	Continental
Satisfaction index[b]	76	76	74	72	70	68	67	67	66
Check-in service[c]	4	3	3	3	3	3	3	3	3
Boarding area	4	3	3	3	3	3	3	3	3
Plane cleanliness	4	3	3	3	3	3	3	3	3
Space on plane	3	3	3	3	3	3	3	3	3
Cabin climate	3	3	3	3	3	3	3	3	3
Flight service	3	4	3	3	3	3	3	3	2
Food quality	4	4	NA	3	3	3	3	2	2
Baggage problems	4	3	4	3	3	3	3	3	2
On-time performance	4	4	4	3	3	3	2	2	3

Source: Based on data presented in *Consumer Reports*, July 1991, p. 468.

[a]Results based on responses to Consumer Union's annual mail survey. More than 140,000 subscribers to *Consumer Reports* provided data on approximately 250,000 domestic flights they had taken between January, 1989 and May, 1990.

[b]Respondents were asked to rate their level of satisfaction with flights they had taken using a six point scale, ranging from completely satisfied to completely dissatisfied. The "overall satisfaction index" was constructed such that had all passengers been completely satisfied with an airline the index would have taken on a value of 100. Had all passenger respondents been completely dissatisfied, the value of the index would have been 0. Differences of less than 3 points were not considered to be meaningful.

[c]Ratings of specific components of service are based on a 5 point scale: 5 = highest rating; 1 = lowest rating.

Exhibit 9 Consumer Complaints Against U.S. Airlines Registered with U.S. Department of Transportation: 1986 to 1991[a]

Complaint Category	Percent of Total Complaints					
	1986	1987	1988	1989	1990	1991
Flight Problems[a]	31.4	44.0	41.1	39.0	39.4	30.7
Baggage	19.9	18.1	18.3	16.1	17.3	14.5
Refunds	15.1	8.1	7.8	9.7	9.1	12.8
Customer Service[b]	6.5	9.5	9.9	9.5	9.8	11.7
Ticketing/ boarding[c]	6.4	6.0	6.7	7.8	8.1	10.8
Fares[d]	4.3	2.3	2.1	3.2	4.1	6.3
Oversales[e]	7.9	5.2	6.3	5.8	5.2	5.0
Advertising	1.1	0.8	0.7	0.8	1.2	1.6
Smoking	2.9	2.2	2.5	2.2	1.0	0.5
Tours	0.3	0.2	0.2	0.2	0.4	0.4
Credit	0.4	0.2	0.2	0.2	0.0	0.2
Other	3.9	3.4	4.3	5.5	4.4	5.6
Total	100.0	100.0	100.0	100.0	100.0	100.0
Total Complaints	10,802	40,985	21,493	10,553	7,703	6,126

Source: U.S. Department of Transportation, Office of Consumer Affairs, *Air Travel Consumer Report*, monthly as reported in *Statistical Abstract of the United States 1992*, Table 1046.

[a]Cancellations, delays etc. from schedule.
[b]Unhelpful employees, inadequate meals or cabin service, treatment of delayed passengers.
[c]Errors in reservations and ticketing; problems in making reservations and obtaining tickets.
[d]Incorrect or incomplete information about fares, discount fare conditions and availability, etc.
[e]All bumping problems, whether or not airline complied with DOT regulations.

Exhibit 10 Hub Operations

Airport	Carriers' Hubs	Percent Changing Planes	Airport Fare Premium[a]	Rank by Airport Size
Chicago-O'Hare	AA, UA	55.7	14.8	1
Dallas/Ft. Worth	AA, DL	65.8	20.5	2
Atlanta	Delta	69.0	17.2	3
Los Angeles	Delta	25.2	-5.3	4
San Francisco	United	25.3	-1.5	5
New York-Kennedy	TWA	47.3	2.9	6
Denver	CO, UA	54.1	15.3	7
New York-La Guardia		6.2	9.5	8
Phoenix	AW	33.1	-28.4	9
Boston		13.8	9.0	10
Detroit	NW	43.6	-0.7	11
Newark	CO	19.6	11.5	12
St. Louis	TWA	56.2	-4.0	13
Miami		31.0	14.3	14
Minneapolis	NW	51.0	31.5	15
Pittsburgh	USAir	62.1	15.9	16
Honolulu		22.4	-20.8	17
Washington National		11.1	10.7	18
Houston-Intercontinental	CO	49.5	15.6	19
Charlotte	USAir	75.7	18.8	20
Orlando		16.8	-15.6	21
Philadelphia	USAir	24.9	11.2	22
Las Vegas	AW	18.9	-27.8	23
Seattle		27.3	8.7	24
San Diego		6.6	-18.1	25
Baltimore	USAir	40.5	9.1	26
Tampa		11.0	-12.4	27
Salt Lake City	Delta	61.3	19.1	28
Memphis	NW	67.7	27.4	29
Houston-Hobby		17.5	-23.4	30

Source: USDOT Databank, 1A, second quarter, 1990, as presented in Severin Borenstein, "The Evolution of U.S. Airline Competition," *Journal of Economic Perspectives* (6), Spring 1992; carriers' hubs are added from Standard and Poor's Industry Surveys, *Aerospace and Air Transport*, June 25, 1992, Table 3, p. 55.

Abbreviations: DL = Delta, AA = American, NW = Northwest, CO = Continental, AW = America West, UA = United.

[a]Percentage difference between fares on local routes at these airports and national average fares on routes of same distance.

Exhibit 11

AA

THE NEXT PAGE IN THE HISTORY OF AIR FARES IS ABOUT TO UNFOLD.

Exhibit 11 (continued)

Exhibit 11 (continued)

AA

HOW AMERICAN IS REVOLUTIONIZING AIR FARES.

The introduction of a highly simplified, cost-efficient fare structure by American Airlines represents a dramatic change designed to bring value back to air travel. What's behind this effort? How is it different? Who will it benefit? The answers to these and other questions are outlined below.

1. HOW IS AMERICAN'S NEW FARE STRUCTURE DIFFERENT?

You can save 38% off today's regular full Coach with our AAnytime℠ fare. Available on any domestic flight. Anytime. Any day. Without any advance-purchase requirements.

When you plan your travel in advance, you can save even more with our new PlanAAhead℠ 7 and PlanAAhead℠ 21 fares. These fares, which carry certain restrictions, offer significant savings, based on how far in advance you buy your ticket. And while PlanAAhead tickets are nonrefundable, they can be reissued for flights on later dates.

Finally, we are introducing a new First Class fare that is 20% to 50% lower than today's full First Class fare and is available on flights throughout the continental U.S.

All of these new fares are good any day of the week, with no charge to change your reservation prior to ticketing. After ticketing, if you need to change your routing or cancel your AAnytime or First Class ticket for a refund, American or your Travel Professional will do so for a $25 administrative service charge. You can also change your PlanAAhead tickets for the same $25 service charge as long as you meet applicable advance-purchase and length-of-stay requirements.

We have also repriced our fares so the amount you pay relates to the distance you travel. In other words, the shorter your trip, the lower your fare.

2. HOW LONG WILL THIS PROGRAM LAST?

These new fares are *not* part of a short-term sale. And our simplified pricing structure is *not* a one-time promotion. It is the way we intend to do business from now on.

3. WHY IS AMERICAN DOING THIS?

Because, like any successful company, we listen to our customers. And time and again, they have told us not only that many airline fares are too expensive, but that the whole fare structure is too complicated.

That's why we've created a program that brings simplicity and value back to air travel.

AANYTIME FARE
38% Off Today's Domestic Full Coach Fare. No Advance Purchase Required.

PLANAAHEAD 7
A Further Reduced Coach Fare. Purchase Your Ticket 7 Days In Advance. Nonrefundable But Reusable.

PLANAAHEAD 21
Our Lowest Coach Fare. Purchase Your Ticket 21 Days In Advance. Nonrefundable But Reusable.

NEW FIRST CLASS
20%-50% Off Today's Full First Class Fare.

Something that's good for business. Both yours and ours.

4. HOW WILL THIS BENEFIT BUSINESS TRAVELERS?

We know that business travelers often had to compromise their schedules to meet inflexible restrictions attached to reduced fares. Now you can travel with complete flexibility, saving 38% off full Coach whenever you fly with our AAnytime fare.

We also know that many business travelers felt that they were paying a fare disproportionately higher than the leisure flyer, who could purchase the same Coach seat for much less by booking in advance. Now, business travelers who must travel on even the shortest notice can still be assured of receiving a savings of 38%.

5. HOW WILL THIS BENEFIT LEISURE TRAVELERS?

Our two PlanAAhead fares make flying economical and simple to understand. With the elimination of other more complex fares, you can feel confident that you'll be getting American's best value for your money, based on how far in advance you can plan your vacation or a visit to friends and relatives. Again, while PlanAAhead tickets are nonrefundable, we have added a new element of flexibility that allows you to exchange your ticket for flights at a later date.

6. HOW WILL IT IMPACT TRAVEL PROFESSIONALS?

Travel agents and company travel professionals will no longer have to go through the time-consuming and complex process of sorting through hundreds of fares to seek out the best value for their clients or company employees. This savings in time will allow the travel professional to devote more attention to providing other travel services.

7. HOW CAN AMERICAN REDUCE FARES IN TODAY'S ECONOMY?

It is no secret that most airlines are struggling to make a profit in today's weak economy. And on the surface, it might appear that reducing our fares could result in losses for American. However, we expect that these lower prices will stimulate demand for our product, substantially increase the number of passengers we carry, and enable us to make a reasonable profit. Also, by simplifying our fare structure, we will spend far less time and money maintaining and updating the large number of fares we currently offer. In summary, increased passengers and decreased costs enable us to reduce our fares.

8. WILL AMERICAN'S NEW REDUCED FARES MEAN REDUCED SERVICE?

Absolutely not. American has always been, and will always be, committed to providing the highest level of customer service regardless of the price you pay for your ticket. Our new fare structure will in no way change that commitment. And, you will also continue to earn full mileage credit with our AAdvantage® travel awards program.

For more information on how this new fare structure can change the way you fly, call your Travel Professional or American at 1-800-433-7300.

AmericanAirlines
BRINGING VALUE BACK TO AIR TRAVEL.℠

Power Play (B): Sega in 16-bit Video Games

I don't like the idea of one company monopolizing an industry.

—Hayao Nakayama, president, Sega Enterprises, Ltd.[1]

We don't regard [Sega] as a competitor in the U.S.

—Hiroshi Yamauchi, president, Nintendo Co., Ltd.[2]

Home video game systems were pioneered by the U.S. company Atari in the mid-1970s. After going through boom and bust in the early 1980s, the industry was resurrected in the mid-1980s by the Japanese company Nintendo. With an 8-bit video game system called variously the Famicom ("Family Computer") and the Nintendo Entertainment System (NES), Nintendo established a dominant position in a greatly expanded home video game market.[3]

In 1987, new 16-bit home video game technology began coming onto the market. First to introduce a next-generation system was the major Japanese electronics company NEC. Second oneout with a 16-bit system was Sega, the leader in the Japanese arcade game business and an unsuccessful player in the 8-bit home video game market.

NEC

Based in Tokyo, Japan, NEC was a leading international supplier of electronics products. The company organized its operations around the "C&C" concept, the integration of computers and communications. On the computer side, NEC manufactured semiconductor devices, supplied

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1 "The Charge of the Hedgehog," Forbes, September 2, 1991, p. 42.
2 *Ibid.*
3 For more details, see "Power Play (A): Nintendo in 8-bit Video Games," HBS No. 795-102.

Professor Adam M. Brandenburger prepared this case as the basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation. The case draws on reports by Anna Minto (MBA'93), Michael Maples, Bartley Troyer, and Michael Tuchen (MBAs'94). Assistance from Research Associate Monique Burnett, Rena Henderson, and Research Assistant Julia Kou, is gratefully acknowledged.

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mainframes, and also held around a 50% share of the Japanese personal computer market. NEC's major communications products included central office switches, microwave equipment, PBXs, and fiber optics. (**Exhibit 2** summarizes financial data on NEC.)

During the mid-1980s, NEC sought to build a strong presence in the higher-ticket segments of the consumer electronics business. It subsequently refocused efforts around a "home theater" concept, with special emphasis on projection televisions and video game systems. NEC's entry into the home video game market came in October 1987, with the launch in Japan of the 16-bit PC Engine. By mid-1989, the installed base of PC Engines had reached a modest 1.5 million units.

Entry into U.S.

In the fall of 1989, NEC introduced an improved 16-bit system, the TurboGrafx-16, to the U.S. market. The system, priced at $200, was targeted at 8- to 16-year-olds. The TurboGrafx delivered higher-quality graphics and sound, and faster action than 8-bit systems could. NEC executive vice-president Kazuya Watanabe explained his company's entry into the home video game market: "We used to think Nintendo was in a completely different business from us. But now we see it's interrelated. The lines have become blurred."[4] Referring to the TurboGrafx, NEC Senior Vice President Keith Schaefer asserted:

> With this product, we are laying the technical groundwork for a true home computer which will be an integral if not the centerpiece of the home theater and information system of tomorrow. . . . Alone among both consumer electronics as well as video game manufacturers, NEC has expertise in a broad variety of related technologies. We are a computer company, a semiconductor company, and we have a broad background in audio and video products.[5]

Parallel with the launch of the TurboGrafx, two NEC businesses—Information Systems and Home Electronics—combined to form NEC Technologies. Their task was to expedite the transfer of computer technology to home electronics.

NEC relied on independent software houses to develop games for the TurboGrafx. Software designers, however, found that the NEC system represented only a small technological advance over 8-bit systems. A limited number of game titles became available for the TurboGrafx, and many of these were viewed as uninspired. Only 500,000 TurboGrafx units were sold through end-1990.

NEC launched a handheld system, the $300 TurboExpress, in the winter of 1990. The TurboExpress boasted a color display and cartridges that were interchangeable with those for the TurboGrafx.

Sega

Two Americans founded Sega ("Service Games") in Tokyo in 1951 to import arcade games and jukeboxes to U.S. military bases in Japan. A few years later, American entrepreneur David Rosen, who had been stationed in Japan with the U.S. Air Force, began importing amusement machines there. In 1965, the two operations combined to form Sega Enterprises. The next year, Sega

[4] "Nintendo Defies Persistent Challengers, "*The Wall Street Journal*, June 27, 1989, p. A12.
[5] "NEC Sees TurboGrafx-16 as a Major Growth Area," *Home Furnishings Daily*, November 27, 1989, p. 66.

introduced its first game, *Periscope,* in which a player fired light-beam "torpedoes" at a row of cardboard cutout submarines. *Periscope* was a big success, and Sega was able to export it to Europe and the United States, where it became the first 25-cent arcade game. (Earlier games had been five- or ten-cent games.) Acquired by U.S. conglomerate Gulf + Western in 1969, Sega grew to become, by the early 80s, the leading operator of arcade centers in Japan.

In 1982, Sega introduced the first three-dimensional arcade game, *SubRoc-3D*. In 1983, Sega moved into home video games with the Japanese launch of an 8-bit home video game system called the SG-1000. The following year, with the crash of the U.S. home video game industry, Gulf + Western sold Sega's U.S. assets to arcade game company Bally Manufacturing. Rosen joined with Hayao Nakayama, a Japanese arcade game entrepreneur who had been drafted as president of Sega in Japan, and CSK, a large Japanese software house, to buy Sega's Japanese assets for $38 million. Sega Enterprises was born again, with the focus on the development, manufacture, and sale of arcade and home video games, and the operation of arcade centers in Japan and overseas.

In 1986, Sega established a U.S. subsidiary, Sega of America, in Redwood City, California. The same year, Sega began distributing its 8-bit system, under the name Master System, through U.S. toy company Tonka. But Sega's 8-bit system enjoyed only limited success in the marketplace, selling no more than 2 million units in Japan and the United States.

Starting in the mid-80s, Sega decided to change the image of its arcade centers. In place of the dark, cramped early centers, it began building large, brightly-lit, spacious arcades in shopping areas and equipping them with games the whole family could enjoy. Its first two large-scale, high-technology centers, Joy Square and Hi-Tech Sega, both in Japan, were opened in July 1988.

Exhibit 3 presents data on Sega's financial performance.

The Mega Drive/Genesis

In October 1988, Sega launched the 16-bit Mega Drive home video game system, priced at ¥21,000 ($165) and targeted at Japanese 12- to 34-four-year-olds. Adapted from Sega's arcade machines, the Mega Drive boasted 512 colors, high-quality sound, and an ability to display several layers of background, among other advances over 8-bit systems. The Mega Drive was designed to expand into a home office via such add-ons as keyboard, printer, and modem. Another add-on allowed users to run SG-1000 games on the Mega Drive.

Sega brought a number of its arcade titles over to the Mega Drive. But it had difficulty persuading third-party software houses to develop games for its new system. Only 200,000 units of the Mega Drive were sold in its first year on the market.

Surveying NEC's and Sega's recent moves, Hiroshi Yamauchi, president of Nintendo, was not impressed: "What we are thinking about is not other firms but the possibility of establishing a network with our game terminals in the U.S."[6]

In September 1989, Sega entered the U.S. home market with its 16-bit system. David Rosen explained: "We take a coin-operated capability and bring it into the home."[7] Called the Genesis, the Sega system was priced at $190, with games retailing for $40 to $70. A $40 adapter made it possible to play the older Master System games on the Genesis. Other games, including titles such

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[6] "Nintendo's Game Boy Soars in Japan," *Nihon Keizai Shimbun*, August 19, 1989, p. 3.
[7] *Reuters*, September 8, 1989.

as the graphically violent *Altered Beast*, were adapted from Sega's line of games for the U.S. arcade market. Sega also signed a deal with the pop star Michael Jackson to assist in developing *Moonwalker*, a video game in which Jackson felled enemies through his dancing prowess. A licensing deal with Disney led to games featuring Mickey Mouse. Specialty software retailers Electronics Boutique, Babbages, and Software Etc., who had been late to get into video games, actively promoted the Genesis. Yet sales were slow.

Sega established a European subsidiary in 1986, and in 1990 began selling its 16-bit system there under the Mega Drive name.

Software Development

Nakayama invested aggressively in game development—breaking Japanese tradition to pay headhunters to hire the best and brightest from Japan's leading technology companies. High salaries and generous development budgets were offered as incentives to join Sega.

In the United States, Sega's first outside game developer was Electronic Arts, which had largely missed the Nintendo bandwagon. Electronic Arts had reverse-engineered the Genesis and was threatening to release games for the platform—with or without Sega's approval. In 1990, it entered into a licensing agreement with Sega involving lower royalties than those available to Nintendo licensees, and giving it the right to manufacture its own cartridges. Electronic Arts proceeded to adapt its successful line of highly realistic 16-bit personal computer sports games to the Genesis platform. Another early Sega licensee was Tengen. Other software houses, too, started signing up. Sega offered these later licensees terms very similar to Nintendo's—except for a slightly higher fee and the absence of an exclusivity clause.

Sega of America grew to 200 in-house and 1,500 freelance developers by 1993. The split was roughly 50:50 between in-house and third-party development of game titles.

Sonic the Hedgehog

In 1990, Nakayama hired Tom Kalinske, former CEO of toy maker Matchbook International and a 15-year veteran of Mattel, to lead Sega of America. In 1991, Kalinske hired Bill White, rival Nintendo's public relations director, to spearhead an aggressive new campaign. Brandishing a fast new game developed by a freelance team under contract to Sega, Kalinske proposed to Nakayama: "We have got to reduce the price of the Sega Genesis by $50. We've got to bundle in our best software—*Sonic the Hedgehog*—and advertise to the world that we are better than the competition."[8] Nakayama bought Kalinske's plan, and in June 1991 the Genesis, together with Sega's game featuring the blue hedgehog Sonic, went on sale for $150. Promoted with the slogan, "Genesis does what Nintendon't," the Sega system developed a "cool" image among teenagers. Sales took off, and software houses scrambled on board. By September that year, there were 130 software titles available for the Genesis.

Game Gear

Sega's entry in the handheld category, featuring a color display like that of the NEC TurboExpress, was the $150 Game Gear, launched in April 1991. Game Gear came bundled with a

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[8] Quoted in "Games Companies Play," *Forbes*, October 25, 1993, p. 68.

game called *Columns*, a *Tetris* knockoff. **Table A** gives U.S. unit sales of handheld video game systems and cartridges.

Table A U.S. Unit Sales of Handheld Systems and Cartridges (millions)

		1989	1990	1991	1992	1993[a]
Nintendo	Systems	1.0	1.1	2.5	4.0	4.0
	Cartridges	3.0	10.0	15.0	18.0	15.0
Sega	Systems			0.6	0.8	1.0
	Cartridges			1.0	3.0	4.0
Others[b]	Systems			0.6	0.5	0.3
	Cartridges			0.8	0.6	0.6

Source: Nintendo Co., Ltd. Annual Reports; Sega Enterprises, Ltd.; *Toy Industry Review 1992*, Gerald Klauer Mattison & Co., October 1992; *Tokyo Business Today*, May 1993; casewriter estimates.

Note: Cartridge figures include licensees' sales.

[a]Estimated.
[b]Principally NEC.

Nintendo in 16-bit Systems

A 16-bit video game system had been under development at Nintendo since the late-1980s. One issue confronting the engineers was whether to make the new system capable of playing existing Nintendo 8-bit games. In the end, they decided against backward compatibility—in part, to keep the cost of the new hardware down. The new system incorporated numerous improvements over the old 8-bit system, including the capability to generate many more colors, high-quality sound, and layered backgrounds. It contained a math co-processor (aimed at facilitating game development) and a better security system.

Super Famicom/Nintendo Entertainment System

Nintendo pre-announced the Japanese launch of its ¥32,000 ($200), 16-bit Super Famicom in late 1989 and began shipping the machines in late November 1990. *Super Mario World*, a 16-bit game developed by Miyamoto, was released at the same time. Within five months, Super Famicom sales swept past the installed base of competing 16-bit systems. Yamauchi boasted that the Super Famicom's success again confirmed that "the name of the game is the games."[9]

Nintendo appeared to be in no rush to introduce its 16-bit system to the U.S. market. NOA's Bill White explained: "The Nintendo philosophy is that we haven't maxed out the 8-bit system yet."[10] Added one industry analyst: "Nintendo will be going back to square one when it introduces

[9] President's Message, Nintendo Co, Ltd. 1991 Annual Report.
[10] "Nintendo's Show of Strength," *Dealerscope Merchandising*, February 1991, p. 15.

its 16-bit system . . . and it will be competing evenly with Sega and NEC."[11] Opinions differed as to the likely fate of the 8-bit market once Nintendo did introduce its new 16-bit system. Some observers anticipated a meltdown: Stretched by the longer lead times needed to develop 16-bit games, software houses would abandon the 8-bit market; retailers would then stop allocating shelf space to 8-bit titles and discount those they did carry; finally, Nintendo itself would stop promoting 8-bit games. Other people painted a more positive scenario: The 30 million pieces of 8-bit Nintendo hardware presented significant opportunities for further 8-bit software sales and, with 3 million to 4 million U.S. children a year turning eight years old, further sales of entry-level hardware could be expected, too.

The $200, 16-bit Super Nintendo Entertainment System (Super NES) was finally launched onto the U.S. market in September 1991 with a $25 million TV advertising campaign, various promotions, and a big write-up in *Nintendo Power*. Games for the Super NES were priced at $50 to $80. The 8-bit business felt the effects. Only 75 new 8-bit titles came onto the market in 1991 (fewer than half the number in previous years) and 8-bit cartridges were now retailing for a low $20 to $40.

Although Nintendo had been selling its 8-bit NES and handheld Game Boy in Europe via distributors, it was only in 1990 that Nintendo established a European subsidiary, Nintendo of Europe, based in Frankfurt. The plan was to wean European consumers on the same 8-bit technology that was now maturing in Japan and the United States, before introducing 16-bit systems. Ron Judy, a former NOA executive who ran a European distributorship for Nintendo, explained: "We still need to develop the game players here. The 8-bit system is still selling very well; it's nowhere near its peak. The bigger the 8-bit base, the more potential customers for the 16-bit machines."[12]

Licensing

At the beginning of October 1990, NOA quietly circulated a memo among its software developers, indicating changes to its licensing policy.[13] Certain of the smaller licensees would be allowed to manufacture games on their own, although they would have to purchase proprietary chips (at $1 apiece) from Nintendo and pay a 20% royalty on every game cartridge sold. Developers would also be allowed to release the same title on the Nintendo and Sega Genesis systems without waiting the two years specified under the old exclusivity clause. NOA explained that the contractual changes were possible because it had succeeded in controlling the quality of games for the NES, and added that licensees continuing to make high-quality games would go on receiving high-profile attention in *Nintendo Power*.

With the release of its 16-bit system, NOA tightened its licensing arrangements. There was no exclusivity clause for 16-bit titles, but NOA took back control of manufacturing the cartridges. The royalty on 16-bit cartridges was set above the level already established by Sega. Over time, Nintendo and Sega pushed 16-bit royalties up to around $20 per manufactured cartridge—an amount that licensees then doubled to retailers. Licensees faced development costs upwards of $500,000 per 16-bit game title.

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[11] "Nintendo Cools Off," *Advertising Age*, December 10, 1990, p. 20.

[12] David Sheff, *Game Over: How Nintendo Conquered the World* (New York: Vintage, 1993), p. 415.

[13] *The Wall Street Journal* October 22, 1990, p. B1.

The 16-bit Battle

There were now three, incompatible, 16-bit systems on the market: the NEC TurboGrafx-16, the Sega Genesis, and the Nintendo Super NES. (**Exhibit 1** lists technical specifications of 16-bit game systems.) Attention centered on the face-off between the Genesis and the Super NES.

By end-1991, about 125 game titles were available for the Genesis, as opposed to 25 titles for the Super NES. NOA announced that sales of the Super NES were heading toward two million units. Sega disagreed, claiming that NOA had sold through at most one million units, while the Genesis installed base had climbed above two million units. At the January 1992 Consumer Electronics Show, NOA announced a $60 million advertising campaign and forecast sales of an additional six million Super NES units by year-end. New Super NES titles to be launched during the coming year included *The Legend of Zelda: A Link to the Past; Super Mario Paint*; and Capcom's *Street Fighter* 2 (based on the most popular arcade game since *Pac-Man*). NOA also moved to September billing of its retailers. Sega responded by mounting its own TV advertising push and worked to expand distribution of the Genesis beyond the 8,000 stores currently carrying its product.

In April, Sega won an injunction against software house Accolade that pulled the developer's existing games off the market and kept it from introducing any more. Accolade had earlier reverse-engineered the Genesis system and was marketing unauthorized Genesis-compatible titles.

In May, NOA reduced the price of the Super NES to $150. At this time, Sega was claiming a 63% share of the U.S. 16-bit market, NOA a 60% share. The same month, both companies started selling stripped-down versions of their 16-bit systems for under $100. NOA reported that 90% of Super NES sales were to people who already owned a Nintendo system. Sega noted that 58% of Genesis buyers owned Nintendo systems.

In 1992, Nintendo judged the European market ready for the Super NES. **Table B** gives unit sales of 16-bit video game systems in Japan, the United States, and Europe.

By January 1993, Sega's Genesis game library comprised 320 titles, with an estimated 110 titles to be added during the year. Nintendo's Super NES library stood at 130 titles, with an estimated 70 titles to be added during the year.

At NOA, Peter Main commented on his company's position in the 16-bit battle: "We're very confident we're going to win the fight, but we are certainly taking nothing for granted."[14] Countered Sega of America's Tom Kalinske: "I will not be satisfied until we have a dominant position."[15] A 1993 "Q" survey found that Nintendo's Mario continued to be more popular than Mickey Mouse among U.S. children, but that Sega's Sonic was now the most popular icon of all.

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[14] "Sega, Aided by Hedgehog, Is Gaining on Nintendo," *The Wall Street Journal*, November 5, 1993, p. B1.
[15] *Ibid.*

Table B Unit Sales of 16-bit Systems and Cartridges (millions)

		1988	1989	1990	1991	1992	1993
Japan							
Nintendo	Systems				1.6	3.5	4.0
Sega	Systems	0.2	0.6	0.9	0.7	0.4	0.8
U.S.							
Nintendo	Systems				0.7	3.5	4.3
	Cartridges				4.0	18.0	20.0
Sega	Systems		0.6	0.7	1.6	4.0	3.7
	Cartridges		1.0	2.4	7.0	15.0	18.0
Others[a]	Systems		0.2	0.3	0.4	0.4	0.2
	Cartridges		NA	NA	2.8	2.3	1.5
Europe							
Nintendo	Systems					1.2	2.5
Sega	Systems			0.6	1.2	3.3	3.5

Source: Nintendo Co., Ltd. Annual Reports; Sega Enterprises, Ltd.; *Toy Industry Review 1992*, Gerald Klauer Mattison & Co., October 1992; *Tokyo Business Today*, May 1993; casewriter estimates.

Note: Cartridge figures include licensees' sales.

[a]Principally NEC.

Exhibit 1 Technical Specifications of Home Video Game Systems

System	Introduction Date	Data Width (# of bits)	Microprocessor	Clock Speed (MHz)	RAM (bytes)
Sega SG-1000/ Master System	1983	8	Zilog Z80	3.6	8K
NEC PC Engine/ TurboGrafx-16	1987	16[a]	Custom 6502	3.6	8K
Sega Mega Drive/Genesis	1988	16	Motorola 68000	7.6	128K
Nintendo Super Famicom/NES	1990	16	65816	3.6	128K
Sega Game Gear	1991	8	Zilog Z80	NA	NA

Sources: Atari Corporation; Boston Computer Exchange; Datasources; *Dealerscope Merchandising*, October 1991.

[a]Technically equivalent to an 8-bit system.

Exhibit 2 NEC Corporation: Financial Data (¥ millions)

Financial Summary	1987	1988	1989	1990	1991	1992	1993
Net sales	2,449,735	2,714,736	3,082,800	3,444,177	3,698,798	3,773,850	3,514,979
Cost of sales	1,701,553	1,874,885	2,098,501	2,283,360	2,416,885	2,520,783	2,394,247
SG&A	655,873	727,016	799,488	927,442	1,067,366	1,131,619	1,093,596
Operating income	92,309	112,835	184,811	233,375	214,547	121,448	27,136
Interest income (expense)	(73,285)	(68,838)	(72,321)	(90,539)	(107,596)	(108,091)	(98,891)
Provision for income taxes	45,473	50,844	87,264	105,567	87,166	45,599	22,019
Other income (expense)	41,483	32,210	39,251	47,950	34,508	47,518	48,614
Net income	15,034	25,363	64,477	85,219	54,293	15,276	(45,160)
Total assets	2,765,891	2,904,928	3,346,412	3,683,999	3,929,533	4,081,217	3,978,899
Long-term obligations	737,707	679,569	855,340	885,650	1,002,146	1,139,697	1,313,257
Shareholders' equity	514,269	593,218	689,361	805,185	880,936	878,353	805,833
Current assets	1,759,630	1,829,952	2,124,187	2,237,099	2,344,694	2,392,819	2,300,489
Current liabilities	1,483,782	1,596,934	1,760,229	1,960,610	1,992,759	2,010,660	1,812,048

Sales by Business Segment	1987	1988	1989	1990	1991	1992	1993
C&C Operations	2,128,936	2,350,425	2,832,926	3,185,840	3,445,742	3,567,715	3,343,283
Communications Systems and Equipment	699,878	757,786	852,289	931,508	1,040,002	1,001,604	961,402
Computers and Industrial Electronics	1,012,098	1,129,680	1,370,140	1,590,099	1,756,648	1,949,007	1,789,240
Electron Devices	416,960	462,959	610,497	664,233	649,092	617,104	592,641
Other Operations[a]	320,799	364,311	249,874	258,337	253,056	206,135	171,696
TOTAL	2,449,735	2,714,736	3,082,800	3,444,177	3,698,798	3,773,850	3,514,979
Exchange rate (¥ per US$)	145	128	138	145	135	127	112

Source: NEC Corporation Annual Reports.

Note: For year ending March 31.

[a]Includes video game sales

Exhibit 3 Sega Enterprises, Ltd.: Financial Data

Financial Summary (¥ millions)

	1988	1989	1990	1991	1992[a]	1993[a]
Net sales	49,116	55,226	78,634	106,580	247,669	416,234
Cost of sales	32,819	38,190	54,594	73,162	159,795	267,664
SG&A expenses	9,501	9,762	11,854	15,548	45,850	81,176
Operating income	6,796	7,274	12,186	17,870	42,024	67,394
Interest income (expense)	(106)	(4)	489	1,593	(2,306)	(4,652)
Provision for income taxes	3,762	3,982	7,915	8,604	21,205	31,064
Other income (expense)	(626)	(433)	85	(2,615)	(6,064)	(921)
Net income	2,302	2,855	4,845	8,244	12,449	30,757
Total assets	44,622	65,956	98,450	115,512	226,065	295,153
Long-term obligations	0	1,250	1,250	1,251	67,194	101,240
Shareholders' equity	29,769	45,640	69,090	77,075	90,318	116,511
Current assets	31,401	48,157	79,581	79,387	174,368	254,124
Current liabilities	14,744	19,500	31,589	37,498	85,992	126,120
Exchange rate (¥ per US$)	128	138	145	135	127	112

Sales by Division (¥ billions)

	1992	1993
Consumer products	135.1	229.3
Domestic sales	24.9	19.3
Exports	110.2	210.0
Amusement center operations	41.4	58.9
Amusement machine sales	36.4	57.6
Domestic sales	29.0	46.3
Exports	7.4	11.2
Royalties on game software	0.4	1.2
TOTAL	213.3	347.0

Source: Sega Enterprises, Ltd. Annual Reports.

Note: For year ending April 30, 1988 through 1990
For 11-month period ending March 31, 1991.
For year ending March 31, 1992 through 1994

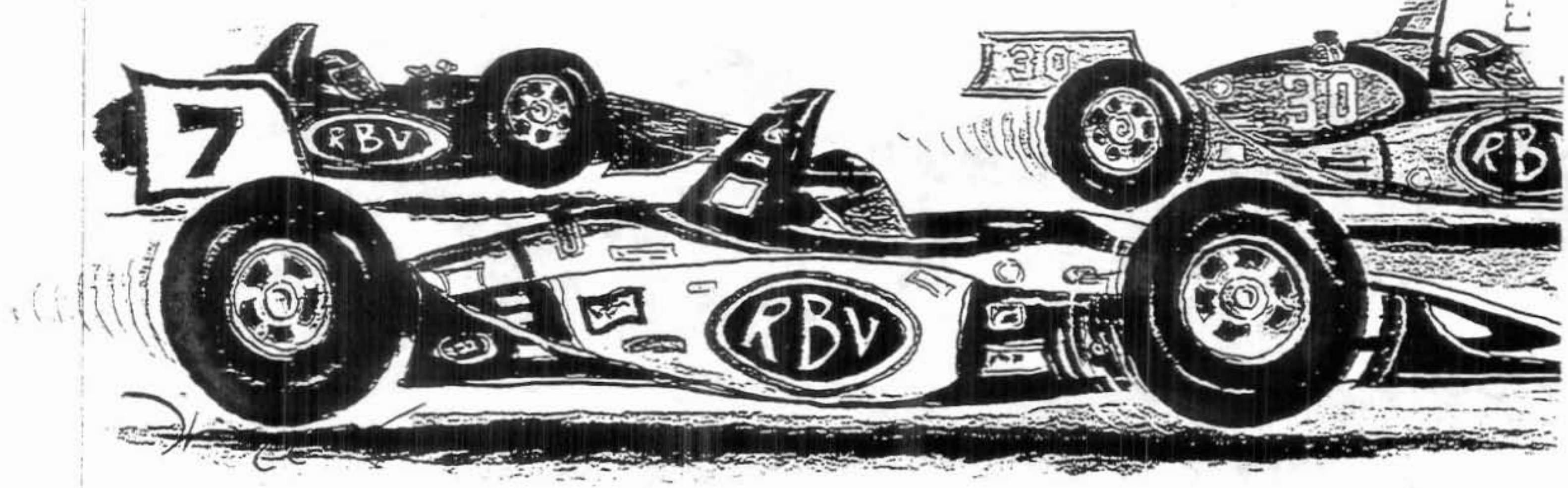
[a]Includes Sega of America, Inc., Sega Europe Group Ltd., and other subsidiaries.

How do you create and sustain a profitable strategy? #95403

12

Competing on Resources:

by David J. Collis and Cynthia A. Montgomery



As recently as ten years ago, we thought we knew most of what we needed to know about strategy. Portfolio planning, the experience curve, PIMS, Porter's five forces – tools like these brought rigor and legitimacy to strategy at both the business-unit and the corporate level. Leading companies, such as General Electric, built large staffs that reflected growing confidence in the value of strategic planning. Strategy consulting boutiques expanded rapidly and achieved widespread recognition. How different the landscape looks today. The armies of planners have all but disappeared, swept away by the turbulence of the past decade. On multiple fronts, strategy has come under fire.

At the business-unit level, the pace of global competition and technological change has left managers struggling to keep up. As markets move faster and faster, managers complain that strategic planning is too static and too slow. Strategy has also become deeply problematic at the corporate level. In the 1980s, it turned out that corporations were often destroying value by owning the very divisions that had seemed to fit so nicely in their growth/share matrices. Threatened by smaller, less hierarchical competitors, many corporate stalwarts either suffered devastating setbacks (IBM, Digital, General Motors, and Westinghouse) or underwent dramatic transformation programs and internal reorganizations (GE and ABB). By the late 1980s, large multibusiness corporations were struggling to justify their existence.

Not surprisingly, waves of new approaches to strategy were proposed to address these multiple assaults on the premises of strategic planning. Many focused inward. The lessons from Tom Peters and Bob Waterman's "excellent" companies led the way, closely followed by total quality management as strategy, reengineering, core competence, competing on capabilities, and the learning organization. Each approach made its contribution in turn, yet how any of them built on or refuted the previously accepted wisdom was unclear. The result: Each compounded the confusion about strategy that now besets managers.

A framework that has the potential to cut through much of this confusion is now emerging from the strategy field. The approach is grounded in economics, and it explains how a company's re-

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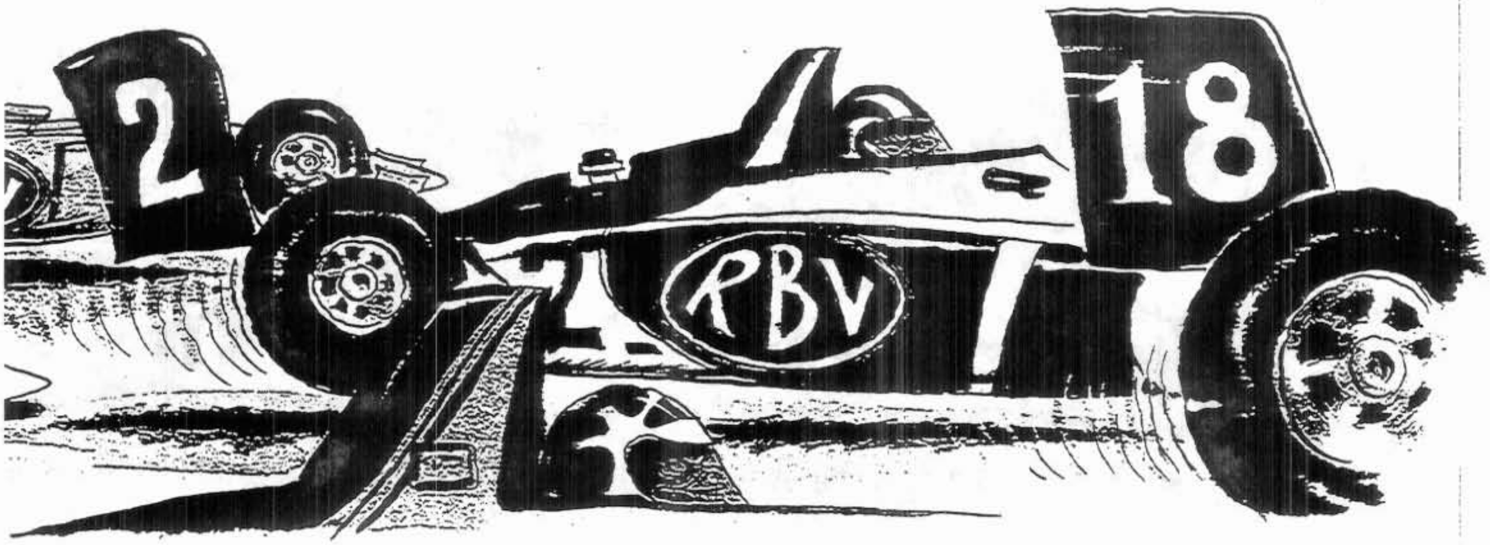
DRAWING BY MICHAEL WITTE

Strategy in the 1990s



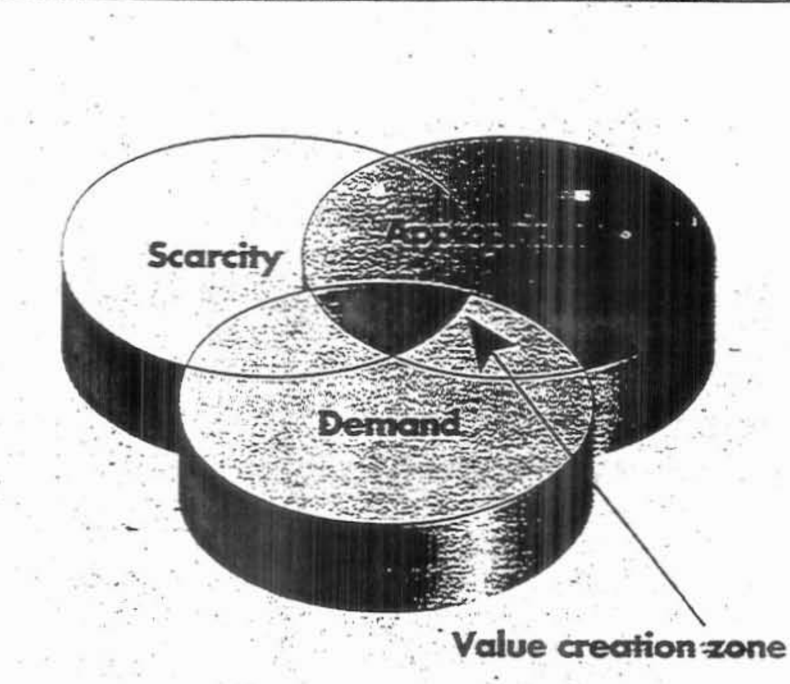
sources drive its performance in a dynamic competitive environment. Hence the umbrella term academics use to describe this work: the *resource-based view of the firm* (RBV).[1] The RBV combines the *internal* analysis of phenomena within companies (a preoccupation of many management gurus since the mid-1980s) with the *external* analysis of the industry and the competitive environment (the central focus of earlier strategy approaches). Thus the resource-based view builds on, but does not replace, the two previous broad approaches to strategy by *combining* internal and external perspectives.[2] It derives its strength from its ability to explain in clear managerial terms why some competitors are more profitable than others, how to put the idea of core competence into practice, and how to develop diversification strategies that make sense. The resource-based view, therefore, will be as powerful and as important to strategy in the 1990s as industry analysis was in the 1980s. (See the insert "A Brief History of Strategy.")

The RBV sees companies as very different collections of physical and intangible assets and capabilities. No two companies are alike because no two companies have had the same set of experiences, acquired the same assets and skills, or built the same organizational cultures. These assets and capabilities determine how efficiently and effectively a company performs its functional activities. Following this logic, a company will be positioned to succeed if it has the best and most appropriate stocks of resources for its business and strategy.

In practice, core competence has too often become a "feel good" exercise that no one fails.

Valuable resources can take a variety of forms, including some overlooked by the narrower conceptions of core competence and capabilities. They can be *physical*, like the wire into your house. Potentially, both the telephone and cable companies are in a very strong position to succeed in the brave new world of interactive multimedia because they own the on-ramp to the information superhighway. Or valuable resources may be *intangible*, such as brand names or technological know-how. The Walt

What Makes a Resource Valuable?



The dynamic interplay of three fundamental market forces determines the value of a resource or a capability.

where the valuable resources might reside in a particular function, such as corporate research and development, or in an asset, such as corporate brand identity. Superior performance will therefore be based on developing a *competitively distinct* set of resources and deploying them in a well-conceived strategy.

Competitively Valuable Resources

Resources cannot be evaluated in isolation, because their value is determined in the interplay with market forces. A resource that is valuable in a particular industry or at a particular time might fail to have the same value in a different industry or chronological context. For example, despite several attempts to brand lobsters, so far no one has been successful in doing so. A brand name was once very important in the personal computer industry, but it no longer is, as IBM has discovered at great cost. Thus the RBV inextricably links a company's internal capabilities (what it does well) and its external industry environment (what the market demands and what competitors offer). Described that way, competing on resources sounds simple. In practice, however, managers often have a hard time identifying and evaluating their companies' resources objectively. The RBV can help by bringing discipline to the often fuzzy and subjective process of assessing valuable resources.

For a resource to qualify as the basis for an effective strategy, it must pass a number of external market tests of its value. Some are so straightforward that most managers grasp them intuitively or even unconsciously. For instance, a valuable resource must contribute to the production of something customers want at a price they are willing to pay. Other tests are more subtle and, as a result, are commonly misunderstood or misapplied. These often turn out to cause strategies to misfire.

1. The test of inimitability: Is the resource hard to copy? Inimitability is at the heart of value creation because it limits competition. If a resource is inimitable, then any profit stream it generates is more likely to be sustainable. Possessing a resource that competitors easily can copy generates only

Disney Company, for example, holds a unique consumer franchise that makes Disney a success in a slew of businesses, from soft toys to theme parks to videos. Similarly, Sharp Corporation's knowledge of flat-panel display technology has enabled it to dominate the $7 billion worldwide liquid-crystal-display (LCD) business. Or the valuable resource may be an *organizational capability* embedded in a company's routines, processes, and culture. Take, for example, the skills of the Japanese automobile companies – first in low-cost, lean manufacturing; next in high-quality production; and then in fast product development. These capabilities, built up over time, transform otherwise pedestrian or commodity inputs into superior products and make the companies that have developed them successful in the global market.

Competitive advantage, whatever its source, ultimately can be attributed to the ownership of a valuable resource that enables the company to perform activities better or more cheaply than competitors. Marks & Spencer, for example, possesses a range of resources that demonstrably yield it a competitive advantage in British retailing. (See the exhibit "How Marks & Spencer's Resources Give It Competitive Advantage.") This is true both at the single-business level and at the corporate level,

temporary value. But because managers fail to apply this test rigorously, they try to base long-term strategies on resources that are imitable. IBP, the first meat-packing company in the United States to modernize, built a set of assets (automated plants located in cattle-rearing states) and capabilities (low-cost "disassembly" of beef) that enabled it to earn returns of 1.3% in the 1970s. By the late 1980s, however, ConAgra and Cargill had replicated these resources, and IBP's returns fell to 0.4%.

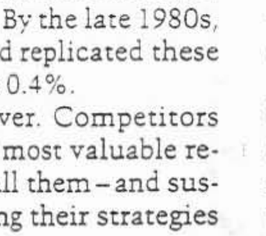
Inimitability doesn't last forever. Competitors eventually will find ways to copy most valuable resources. But managers can forestall them – and sustain profits for a while – by building their strategies around resources that have at least one of the following four characteristics:

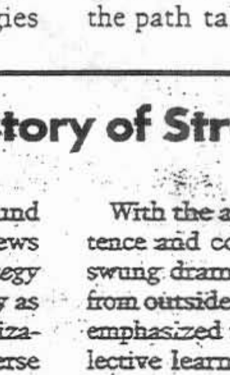
The first is *physical uniqueness*, which almost by definition cannot be copied. A wonderful real estate location, mineral rights, or Merck & Company's pharmaceutical patents simply cannot be imitated. Although managers may be tempted to think that many of their resources fall into this category, on close inspection, few do.

A greater number of resources cannot be imitated because of what economists call *path dependency*. Simply put, these resources are unique and, therefore, scarce because of all that has happened along the path taken in their accumulation. As a result,

A Brief History of Strategy

The field of strategy has largely been shaped around a framework first conceived by Kenneth R. Andrews in his classic book *The Concept of Corporate Strategy* (Richard D. Irwin, 1971). Andrews defined strategy as the match between what a company *can* do (organizational strengths and weaknesses) within the universe of what it *might* do (environmental opportunities and threats).





Although the power of Andrews's framework was recognized from the start, managers were given few insights about how to assess either side of the equation systematically. The first important breakthrough came in Michael E. Porter's book *Competitive Strategy: Techniques for Analyzing Industries and Competitors* (Free Press, 1980). Porter's work built on the structure-conduct-performance paradigm of industrial-organization economics. The essence of the model is that the structure of an industry determines the state of competition within that industry and sets the context for companies' conduct – that is, their strategy. Most important, structural forces (which Porter called the five forces) determine the average profitability of the industry and have a correspondingly strong impact on the profitability of individual corporate strategies.

This analysis put the spotlight on choosing the "right industries" and, within them, the most attractive competitive positions. Although the model did not ignore the characteristics of individual companies, the emphasis was clearly on phenomena at the industry level.

With the appearance of the concepts of core competence and competing on capabilities, the pendulum swung dramatically in the other direction, moving from outside to inside the company. These approaches emphasized the importance both of the skills and collective learning embedded in an organization and of management's ability to marshal them. This view assumed that the roots of competitive advantage were inside the organization and that the adoption of new strategies was constrained by the current level of the company's resources. The external environment received little, if any, attention, and what we had learned about industries and competitive analysis seemed to disappear from our collective psyche.

The emerging resource-based view of the firm helps to bridge these seemingly disparate approaches and to fulfill the promise of Andrews's framework. Like the capabilities approaches, the resource-based view acknowledges the importance of company-specific resources and competencies, yet it does so in the context of the competitive environment. The resource-based view shares another important characteristic with industry analysis: It, too, relies on economic reasoning. It sees capabilities and resources as the heart of a company's competitive position, subject to the interplay of three fundamental market forces: demand (does it meet customers' needs, and is it competitively superior?), scarcity (is it imitable or substitutable, and is it durable?), and appropriability (who owns the profits?). The five tests described in the article translate these general economic requirements into specific, actionable terms.

competitors cannot go out and buy these resources instantaneously. Instead, they must be built over time in ways that are difficult to accelerate.[3]

The Gerber Products Company brand name for baby food, for example, is potentially imitable. Recreating Gerber's brand loyalty, however, would take a very long time. Even if a competitor spent hundreds of millions of dollars promoting its baby food, it could not buy the trust that consumers associate with Gerber. That sort of brand connotation can be built only by marketing the product steadily for years, as Gerber has done. Similarly, crash R&D programs usually cannot replicate a successful technology when research findings cumulate. Having many researchers working in parallel cannot speed the process, because bottlenecks have to be solved sequentially. All this builds protection for the original resource.

Banking on the durability of most core competencies is risky. They have limited lives and will earn only temporary profits.

The third source of inimitability is *causal ambiguity*. Would-be competitors are thwarted because it is impossible to disentangle either what the valuable resource is or how to re-create it. What *really* is the cause of Rubbermaid's continued success in plastic products? We can draw up lists of possible reasons. We can try, as any number of competitors have, to identify its recipe for innovation. But, in the final analysis, we cannot duplicate Rubbermaid's success.

Causally ambiguous resources are often organizational capabilities. These exist in a complex web of social interactions and may even depend critically on particular individuals. As Continental and United try to mimic Southwest's successful low-cost strategy, what will be most difficult for them to copy is not the planes, the routes, or the fast gate turnaround. All of those are readily observable and, in principle, easily duplicated. However, it will be difficult to reproduce Southwest's culture of fun, family, frugality, and focus because no one can quite specify exactly what it is or how it arose.

The final source of inimitability, *economic deterrence*, occurs when a company preempts a competitor by making a sizable investment in an asset. The competitor could replicate the resource but, because of limited market potential, chooses not to. This is most likely when strategies are built around large capital investments that are both scale sensitive and specific to a given market. For example, the minimum efficient scale for float-glass plants is so large that many markets can support only one such facility. Because such assets cannot be redeployed, they represent a credible commitment to stay and fight it out with competitors who try to replicate the investment. Faced with such a threat, potential imitators may choose not to duplicate the resource when the market is too small to support two players the size of the incumbent profitably. That is exactly what is now occurring in Eastern Europe. As companies rush to modernize, the first to build a float-glass facility in a country is likely to go unchallenged by competitors.

2. The test of durability: How quickly does this resource depreciate? The longer lasting a resource is, the more valuable it will be. Like inimitability, this test asks whether the resource can sustain competitive advantage over time. While some industries are stable for years, managers today recognize that most are so dynamic that the value of resources depreciates quickly. Disney's brand name survived almost two decades of benign neglect between Walt Disney's death and the installation of Michael D. Eisner and his management team. In contrast, technological know-how in a fast-moving industry is a rapidly wasting asset, as the list of different companies that have dominated successive generations of semiconductor memories illustrates. Economist Joseph A. Schumpeter first recognized this phenomenon in the 1930s. He described waves of innovation that allow early movers to dominate the market and earn substantial profits. However, their valuable resources are soon imitated or surpassed by the next great innovation, and their superior profits turn out to be transitory. Schumpeter's description of major companies and whole industries blown away in a gale of "creative destruction" captures the pressure many managers feel today. Banking on the durability of most core competencies is risky. Most resources have a limited life and will earn only temporary profits.

3. The test of appropriability: Who captures the value that the resource creates? Not all profits from a resource automatically flow to the company that "owns" the resource. In fact, the value is always subject to bargaining among a host of players, including customers, distributors, suppliers, and employees. What has happened to leveraged buyout

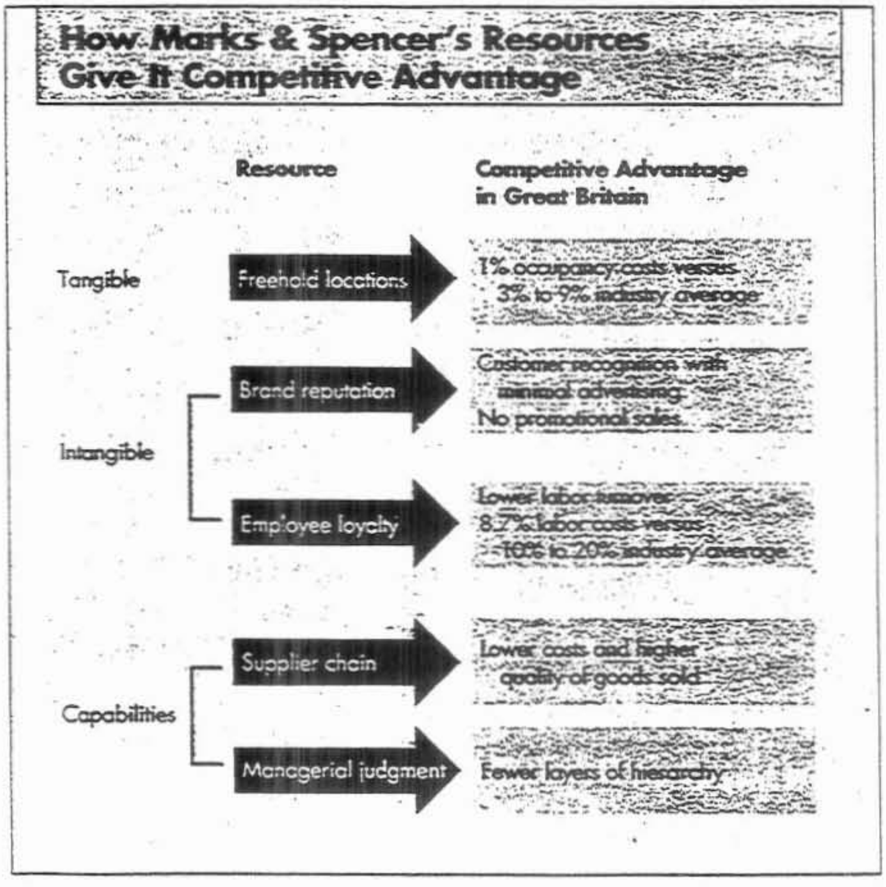
firms is revealing. A critical resource of LBO firms was the network of contacts and relationships in the investment banking community. However, this resource often resided in the individuals doing the deals, not in the LBO firms as a whole. These individuals could – and often did – depart to set up their own LBO funds or move to another firm where they could reap a greater share of the profits that their resource generated. Basing a strategy on resources that are not inextricably bound to the company can make profits hard to capture.

4. The test of substitutability: Can a unique resource be trumped by a different resource? Since Michael E. Porter's introduction of the five-forces framework, every strategist has been on the lookout for the potential impact of substitute products. The steel industry, for example, has lost a major market in beer cans to aluminum makers in the past 20 years. The resource-based view pushes this critical question down a level to the resources that underpin a company's ability to deliver a good or service. Consider the following example. In the early 1980s, People Express Airlines challenged the major airlines with a low-price strategy. Founder Donald C. Burr pursued this strategy by developing a unique no-frills approach and an infrastructure to deliver low-cost flights. Although the major airlines were unable to replicate this approach, they nevertheless were able to retaliate using a *different* resource to offer consumers equivalent low-cost fares – their computer reservation systems and yield-management skills. This substitution eventually drove People Express into bankruptcy and out of the industry.

5. The test of competitive superiority: Whose resource is really better? Perhaps the greatest mistake managers make when evaluating their companies' resources is that they do not assess them relative to competitors'. Core competence has too often become a "feel good" exercise that no one fails. Every company can identify one activity that it does relatively better than other activities and claim that as its core competence. Unfortunately, core competence should not be an internal assessment of which activity, of all its activities, the company performs best. It should be a harsh external assessment of what it does better than competitors, for which the term *distinctive competence* is more appropriate. How many consumer packaged-goods companies assert that their core competence is consumer marketing skills? They may indeed all be good at that activity, but a corporate strategy built on such a core competence will rapidly run into trouble because other competitors with better skills will be pursuing the same strategy.

The way to avoid the vacuousness of generic statements of core competence is to disaggregate the corporation's resources. The category *consumer marketing skills*, for example, is too broad. But it can be divided into subcategories such as effective brand management, which in turn can be divided into skills such as product-line extensions, cost-effective couponing, and so on. Only by looking at this level of specificity can we understand the sources of a company's uniqueness and measure by analyzing the data whether it is competitively superior on those dimensions. Can anyone evaluate whether Kraft General Foods' or Unilever's consumer marketing skills are better? No. But we can demonstrate quantitatively which is more successful at launching product-line extensions.

Disaggregation is important not only for identifying truly distinctive resources but also for deriving



How Marks & Spencer's Resources Give It Competitive Advantage

actionable implications. How many companies have developed a statement of their core competencies and then have struggled to know what to do with it? One manufacturer of medical-diagnostics test equipment, for example, defined one of its core competencies as instrumentation. But this intuitively obvious definition was too broad to be actionable. By pushing to deeper levels of disaggregation, the company came to a powerful insight. In fact, its strength in instrumentation was mainly attributable to its competitive superiority in designing the interface between its machines and the people who use them. As a result, the company decided to reinforce its valuable capability by hiring ergonomists, and it expanded into doctors' offices, a fast-growing segment of its market. There, the company's resources created a real competitive advantage, in part because its equipment can be operated by office personnel rather than only by technicians.

The greatest mistake managers make when evaluating their resources is failing to assess them relative to competitors'.

Although disaggregation is the key to identifying competitively superior resources, sometimes the valuable resource is a combination of skills, none of which is superior by itself but which, when combined, make a better package. Honeywell's industrial automation systems are successful in the marketplace – a measure that the company is good at something. Yet each individual component and software program might not be the best available. Competitive superiority lies either in the weighted average (the company does not rank first in any resource, but it is still better on average than any competitor) or in its system-integration capability.

The lesson for managers is that conclusions about critical resources should be based on objective data from the market. In our experience, managers often treat core competence as an exercise in intuition and skip the thorough research and detailed analysis needed to get the right answer.

Strategic Implications

Managers should build their strategies on resources that meet the five tests outlined above. The best of these resources are often intangible, not physical, hence the emphasis in recent approaches on the softer aspects of corporate assets – the culture, the technology, and the transformational leader. The tests capture how market forces determine the value of resources. They force managers to look inward and outward at the same time.

However, most companies are not ideally positioned with competitively valuable resources. More likely, they have a mixed bag of resources – some good, some mediocre, and some outright liabilities, such as IBM's monolithic mainframe culture. The harsh truth is that most companies' resources do not pass the objective application of the market tests.

Even those companies that are fortunate enough to have unusual assets or capabilities are not home free. Valuable resources must still be joined with other resources and embedded in a set of functional policies and activities that distinguish the company's position in the market – after all, competitors can have core competencies, too.

Strategy requires managers to look forward as well. Companies fortunate enough to have a truly distinctive competence must also be wise enough to realize that its value is eroded by time and competition. Consider what happened to Xerox. During what has become known as its "lost decade," the 1970s, Xerox believed its reprographic capability to be inimitable. And while Xerox slept, Canon took over world leadership in photocopiers.

In a world of continuous change, companies need to maintain pressure constantly at the frontiers – building for the next round of competition. Managers must therefore continually invest in and upgrade their resources, however good those resources are today, and leverage them with effective strategies into attractive industries in which they can contribute to a competitive advantage.

Investing in Resources. Because all resources depreciate, an effective corporate strategy requires continual investment in order to maintain and build valuable resources. One of Eisner's first actions as CEO at Disney was to revive the company's commitment to animation. He invested $50 million in *Who Framed Roger Rabbit?* to create the company's first animated feature-film hit in many years and quadrupled its output of animated feature films – bringing out successive hits, such as *Beauty and the Beast*, *Aladdin*, and *The Lion King*.

Similarly, Marks & Spencer has periodically reexamined its position in its only business – retailing – and has made major investments to stay com-

petitive. In the early 1980s, the British company spent billions on store renovation, opened new edge-of-town locations, and updated its procurement and distribution systems. In contrast, the U.S. retailer Sears, Roebuck and Company diversified into insurance, real estate, and stock brokerages, while failing to keep up with the shift in retailing to new mall locations and specialty stores.

The mandate t reinvest in strategic resources may seem obvious. The great contribution of the core competence notion is its recognition that, in corporations with a traditional divisional structure, investment in the corporation's resources often takes a backseat to optimizing current divisional profitability. Core competence, therefore, identifies the critical role that the corporate office has to play as the guardian of what are, in essence, the crown jewels of the corporation. In some instances, such guardianship might even require explicitly establishing a corporate officer in charge of nurturing the critical resources. Cooper Industries, a diversified manufacturer, established a manufacturing services group to disseminate the best manufacturing practices throughout the company. The group helped "Cooperize" acquired companies, rationalizing and improving their production facilities. The head of the services group, Joseph R. Coppola, was of a caliber to be hired away as CEO of Giddings &

What Ever Happened to the Dogs and Cash Cows?

In the late 1960s and early 1970s, the wisdom of the day was that companies could transfer the competitive advantage of professional management across a broad range of businesses. Many companies responded to the perceived opportunity. Armed with decentralized structures and limited, but tight, financial controls, they diversified into a number of related and unrelated businesses, mostly through acquisition. In time, such conglomerates came to resemble miniature economies in their own right. There appeared to be no compelling limits to the scope of corporations.

As the first oil crisis hit in 1973, corporate managers faced deteriorating performance and had little advice on how to act. Into this vacuum came the Boston Consulting Group and portfolio management. In BCG's now famous growth/share matrix, corporate management was finally given a tool with which to reassert control over its many divisions.

This simple matrix allowed managers to classify each division, since renamed a strategic business unit, into a quadrant based on the growth of its industry, and the relative strength of the unit's competitive position.

There was a prescribed strategy for each position in the matrix: sustain the cash-generating cows, divest or harvest the dogs, take cash from the cows and invest in question marks in order to make them stars, and increase the market share of the stars until their industry growth slowed and they became the next generation of cash cows. Such simple prescriptions gave corporate management both a sense of what their strategy should accomplish – a balanced portfolio of businesses – and a way to control and allocate resources to their divisions.

The problem with the portfolio matrix was that it did not address how value was being created across the divisions, which could be as diverse as semiconductors and hammers. The only relationship between them was cash. As we have come to learn, the relatedness of businesses is at the heart of value creation in diversified companies. The portfolio matrix also suffered from its assumption that corporations had to be self-sufficient in capital. That implied that they should find a use for all internally generated cash and that they could not raise additional funds from the capital market. The capital markets of the 1980s demonstrated the fallacy of such assumptions.

In addition, the growth/share matrix failed to compare the competitive advantage a business received from being owned by a particular company with the costs of owning it. In the 1980s, many companies built enormous corporate infrastructures that created only small gains at the business-unit level. During the same period, the market for corporate control heated up, focusing attention on value for shareholders. Many companies with supposedly model portfolios were accordingly dissolved.

PHOTOS BY TONY RINALDO

Lewis, the largest U.S. machine tool manufacturer. Similarly, many professional service firms, such as Coopers & Lybrand, have a senior partner in charge of their critical capabilities – client-relationship management, staff training, and intellectual development. Valuable corporate resources are often supradivisional, and, unless someone is managing them on that basis, divisions will underinvest in them or free ride on them.

At the same time, investing in core competencies without examining the competitive dynamics that determine industry attractiveness is dangerous. By ignoring the marketplace, managers risk investing heavily in resources that will yield low returns. Masco Corporation did exactly that. It built a competence in metalworking and diversified into tightly related industries. Unfortunately, the returns from this strategy were lower than the company had expected. Why? A straightforward five-forces analysis would have revealed that the structure of the industries Masco entered was poor – buyers were price sensitive with limited switching costs, entry barriers were low, and suppliers were powerful. Despite Masco's metalworking expertise, its industry context prevented it from achieving exceptional returns until it developed the skills that enabled it to enter more attractive industries.

Similarly, if competitors are ignored, the profits that could result from a successful resource-based strategy will dissipate in the struggle to acquire those resources. Consider the value of the cable wire into your house as a source of competitive advantage in the multimedia industry. Companies such as Time Warner have been forced by competitors, who can also see the value of that wire, to bid billions of dollars to acquire control of even modest cable systems. As a result, they may never realize substantial returns on their investment. This is true not only for resources acquired on the market but also for those core competencies that many competitors are simultaneously trying to develop internally.

Ironically, many diversification efforts fail because even the companies that own valuable resources can't replicate them.

Upgrading Resources. What if a company has no unusually valuable resources? Unfortunately, that is a common experience when resources are evaluated against the standard of competitive superiority. Or what if a company's valuable resources have been imitated or substituted by competitors? Or perhaps its resources, like Masco's, are valuable only in industries so structurally unattractive that, regardless of how efficiently it operates, its financial returns will never be stellar. In these cases–indeed, in nearly all cases–companies must continually upgrade the number and quality of their resources and associated competitive positions in order to hold off the almost inevitable decay in their value.

Upgrading resources means moving beyond what the company is already good at, which can be accomplished in a number of ways. The first is by adding new resources, the way Intel Corporation added a brand name, Intel Inside, to its technological resource base. The second is by upgrading to alternative resources that are threatening the company's current capabilities. AT&T is trying to build capabilities in multimedia now that its physical infrastructure–the network–is no longer unique or as critical as it once was. Finally, a company can upgrade its resources in order to move into a structurally more attractive industry, the way Nucor Corporation, a U.S. steel company, has made the transition from competitive, low-margin, downstream businesses, such as steel joists, into more differentiated, upstream businesses, such as thin-slab cast-steel sheets.

Perhaps the most successful examples of upgrading resources are in companies that have added new competencies sequentially, often over extended periods of time. Sharp provides a wonderful illustration of how to exploit a virtuous circle of sequentially upgrading technologies and products, what the Japanese call "seeds and needs." In the late 1950s, Sharp was an assembler of televisions and radios, seemingly condemned to the second rank of Japanese consumer electronics companies. To break out of that position, founder Tokuji Hayakawa, who had always stressed the importance of innovation, created a corporate R&D facility. When the Japanese Ministry of International Trade and Industry blocked Sharp from designing computers, the company used its limited technology to produce the world's first digital calculator in 1964. To strengthen its position in this business, Sharp backward integrated into manufacturing its own specialized semiconductors and made a strong commitment to the new liquid-crystal-display technology. Sharp's bet on LCD technology paid

off and enabled it to develop a number of new products, such as the Wizard electronic organizer. Over time, the superiority of its display technology gave Sharp a competitive advantage in businesses it had previously struggled in, such as camcorders. Its breakthrough product, Viewcam, captured 20% of the Japanese market within six months of release in 1992.

At each stage, Sharp took on a new challenge, whether to develop or improve a technology or to enter or attack a market. Success in each endeavor improved the company's resources in technology, distribution, and organizational capability. It also opened new avenues for expansion. Today, Sharp is the dominant player in the LCD market and a force in consumer electronics.

Cooper provides another example. Challenged to justify its plan to acquire Champion Spark Plug Company in 1989, when fuel injection was replacing spark plugs, Cooper reasoned that it had the resources to help Champion improve its position, as it had done many times before with products such as Crescent wrenches, Nicholson files, and Gardner-Denver mining equipment. But what really swung the decision, according to Cooper chairman and CEO Robert Cizik, was the recognition that Cooper lacked a critical skill it needed for the future – the ability to manage international manufacturing. With its numerous overseas plants, Champion offered Cooper the opportunity to acquire global management capabilities. The Champion acquisition, in Cizik's view, was a way to upgrade Cooper's resources. Indeed, a review of the company's history shows that Cooper has deliberately sought to improve its capabilities gradually by periodically taking on challenges it knows will have a high degree of difficulty for the organization.

Leveraging Resources. Corporate strategies must strive to leverage resources into all the markets in which those resources contribute to competitive advantage or to compete in new markets that improve the corporate resources. Or, preferably, both, as with Cooper's acquisition of Champion. Failure to do so, as occurred with Disney following the death of its founder, leads a company to be undervalued. Eisner's management team, which extended the scope of Disney's activities into hotels, retailing, and publishing, was installed in response to a hostile-takeover threat triggered by the underutilization of the company's valuable resources.

Good corporate strategy, then, requires continual reassessment of the company's scope. The question strategists must ask is, How far can the company's valuable resource be extended across markets? The answer will vary widely because resources differ greatly in their specificity, from highly fungible resources (such as cash, many kinds of machinery, and general management skills) to much more specialized resources (such as expertise in narrow scientific disciplines and secret product formulas). Specialized resources often play a critical role in securing competitive advantage, but, because they are so specific, they lose value quickly when they are moved away from their original settings. Shell Oil Company's brand name, for example, will not transfer well outside autos and energy, however valuable it is within those fields. Highly fungible resources, on the other hand, transfer well across a wide range of markets but rarely constitute the key source of competitive advantage.

> Newell's success comes from deploying its capabilities in a structurally attractive industry.

The RBV helps us understand why the track record of corporate diversification has been so poor and identifies three common and costly strategic errors companies make when they try to grow by leveraging resources. First, managers tend to overestimate the transferability of specific assets and capabilities. The irony is that because valuable resources are hard to imitate, the company itself may find it difficult to replicate them in new markets. Despite its great success in Great Britain, Marks & Spencer has failed repeatedly in attempts to leverage its resources in the North American market – a classic example of misjudging the important role that context plays in competitive advantage. In this case, the concepts of path dependency and causal ambiguity are both at work. Marks & Spencer's success is rooted in its 100-year reputation for excellence in Great Britain and in the skills and relationships that enable it to manage its domestic supply chain effectively. Just as British competitors have been unable to duplicate this set of advantages, Marks & Spencer itself struggles to do so when it tries to enter a new market against established competitors.

Second, managers overestimate their ability to compete in highly profitable industries. Such industries are often attractive precisely because entry barriers limit the number of competitors. Entry barriers are really resource barriers: The reason com-

petitors find it so hard to enter the business is that accumulating the necessary resources is difficult. If it could be done easily, competitors would flock to the opportunity, driving down average returns. Many managers fail to see the connection between company-level resources and industry-level profits and convince themselves that they can vault the entry barrier, without considering which factors will ultimately determine success in the industry. Philip Morris Companies' entry into soft drinks, for example, foundered on the difficulties it faced managing the franchise distribution network. After years of poor performance in that business, it gave up and divested 7-Up.

The third common diversification mistake is to assume that leveraging generic resources, such as lean manufacturing, will be a major source of competitive advantage in a new market – regardless of the specific competitive dynamics of that market. Chrysler Corporation seems to have learned this lesson. Expecting that its skills in design and manufacturing would ensure success in the aerospace industry, Chrysler acquired Gulfstream Aerospace Corporation – only to divest it five years later in order to concentrate on its core businesses.

Despite the common pitfalls, the rewards for companies that leverage their resources appropriately, as Disney has, are high. Newell Company is another stunning example of a company that has built a set of capabilities and used them to secure commanding positions for products in a wide range of industries. Newell was a modest manufacturer of drapery hardware in 1967, when a new CEO, Daniel C. Ferguson, articulated its strategy: The company would specialize in high-volume production of a variety of household and office staple goods that would be sold through mass merchandisers. The company made a series of acquisitions, each of which benefited from Newell's capabilities – its focused control systems; its computer links with mass discounters, which facilitate paperless invoicing and automatic inventory restocking; and its expertise in the "good-better-best" merchandising of basic products, in which retailers typically choose to carry only one brand, with several quality and price levels. In turn, each acquisition gave Newell yet another opportunity to strengthen its capabilities. Today, Newell holds leading market positions in drapery hardware, cookware, glassware, paintbrushes, and office products and maintains an impressive 15% earnings growth annually. What differentiates this diversified company from a host of others is how it has been able to use its corporate resources to establish and maintain competitive advantage at the business-unit level.

However, even Newell benefits from the attractiveness of the markets in which it competes. All its products are infrequently purchased, low-cost items. Most consumers will not spend time comparison shopping for six glasses, nor do they have a sense of the market price. Do you know if $3.99 is too much to pay for a brass curtain rod? Thus Newell's resources are all the more valuable for being deployed in an attractive industry context.

Whether a company is building a strategy based on core competencies, is developing a learning organization, or is in the middle of a transformation process, those concepts can all be interpreted as a mandate to build a unique set of resources and capabilities. However, this must be done with a sharp eye on the dynamic industry context and competitive situation, rigorously applying market tests to those resources. Strategy that blends two powerful sets of insights about capabilities and competition represents an enduring logic that transcends management fads.

That this approach pays off is demonstrated by the impressive performance of companies such as Newell, Cooper, Disney, and Sharp. Although these companies may not have set out explicitly to craft resource-based strategies, they nonetheless capture the power of this logic and the returns that come to those who do.

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1. A number of insightful articles have been written on the resource-based view, including: Birger Wernerfelt, "A Resource-Based View of the Firm," *Strategic Management Journal*, September-October 1984, p. 171; J.B. Barney, "Strategic Factor Markets: Expectations, Luck and Business Strategy," *Management Science*, October 1986, p. 1,231; Richard P. Rumelt, "Theory, Strategy, and Entrepreneurship," in *The Competitive Challenge: Strategies for Industrial Innovation and Renewal*, ed. David J. Teece (Cambridge, Mass.: Ballinger, 1987), p. 137; Ingemar Dierickx and Karel Cool, "Asset Stock Accumulation and Sustainability of Competitive Advantage," *Management Science*, December 1989, p. 1,504; Kathleen R. Conner, "A Historical Comparison of Resource-Based Theory and Five Schools of Thought Within Industrial Organization Economics: Do We Have a New Theory of the Firm?" *Journal of Management*, March 1991, p. 121; Raphael Amit and Paul J.H. Schoemaker, "Strategic Assets and Organizational Rent," *Strategic Management Journal*, January 1993, p. 33; and Margaret A. Peteraf, "The Cornerstones of Competitive Advantage: A Resource-Based View," *Strategic Management Journal*, March 1993, p. 179.

2. To date, the most attention paid to the integration of the two perspectives has been by Michael E. Porter in *Competitive Advantage: Creating and Sustaining Superior Performance* (New York: Free Press, 1985) and, in the dynamic context, in his article "Towards a Dynamic Theory of Strategy," *Strategic Management Journal*, Winter 1991, p. 95.

3. These ideas were first discussed in two articles published in *Management Science*: Ingemar Dierickx and Karel Cool, "Asset Stock Accumulation and Sustainability of Competitive Advantage," December 1989, p. 1,504; and J.B. Barney, "Asset Stocks and Sustained Competitive Advantage," December 1989, p. 1,512.

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13
WHARTON REPROGRAPHICS

Wal-Mart Stores' Discount Operations

Professor Pankaj Ghemawat prepared this case as the basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation.

In October 1985, *Forbes* declared Sam Walton the richest person in the United States. With his four children, he owned stock worth $2.8 billion. That put him $1 billion ahead of the next person on the list, H. Ross Perot. By the end of April 1986, Walton's net worth had swelled by another $1.6 billion.

Walton's fortune consisted of a 39% stake in Wal-Mart Stores, a retailer that had focused historically on the Southwest. Although Wal-Mart had begun to diversify into other areas, discounting still accounted for 91% of the company's sales in 1985 and 96% of its pretax profits. Wal-Mart had consistently led other discounters in both profitability and growth. *Exhibit 1* summarizes Wal-Mart's history over the past decade; *Exhibit 2* compares its performance with that of its competitors. As a result of such comparisons, Wal-Mart's market value in early 1986 was twice K mart's, even though it was only a third as large. Analysts thought that Wal-Mart would overtake K mart as the largest discounter by the turn of the century, but they were divided over whether Wal-Mart stock remained a good buy at a price-earnings multiple of 26.

This case describes discount retailing and the distinctive features of Wal-Mart's discount operations. It also sketches the areas into which Wal-Mart was diversifying in the mid-1980s.

Discount Retailing

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Discount stores emerged in the United States in the mid-1950s. They followed on the heels of supermarkets, which sold food at unprecedentedly low margins. Discount stores extended this approach to general merchandise by charging gross margins that were 10%–15% lower than those of conventional department stores. To

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compensate, discount stores cut costs to the bone: fixtures were distinctly unluxurious, in-store selling was limited, and ancillary services, such as tailoring, delivery, and credit, were scarce.

The discounters' timing was just right. Consumers had become increasingly better informed since World War II. Supermarkets had educated them about self-service, many categories of general merchandise had matured, and TV had intensified advertising by manufacturers. Government standards also bolstered consumers' self-confidence. Many were ready to try cheaper, self-service retailers except for products that were big-ticket items, technologically complex, or "psychologically significant."

Discount retailing burgeoned as a result. Discounters' sales grew from $2 billion in 1960 to $68 billion in 1985. Penetration continued: by the year 2000, discounters' sales were expected to climb to $98 billion (in 1985 dollars).[1]

But too many players had gotten into discounting at the local, regional, or national level. Industry growth peaked in the 1970s: during that decade, the number of stores increased by 64% and (undeflated) sales by 144%. Over the 1980–1985 period, the number of discount stores increased by only 8%. Several large chains—including King's, Korvette's, Mammoth Mart, W.T. Grant, Two Guys, and Woolco—failed in the late 1970s and early 1980s; many of the padlocked stores were acquired and recycled by survivors. (*Exhibit 3* depicts the average economics of discounting in 1984.)

Wal-Mart's Discount Stores

History

Although Wal-Mart Stores was incorporated in 1969, it was rooted in the variety store—franchised by Ben Franklin—that Sam Walton had opened in Newport, Arkansas, in 1945. Through 1962, Sam Walton and his brother, Bud, built up a chain of 16 variety stores in rural Arkansas that was considered Ben Franklin's most successful franchisee. But regional entry by discount stores increasingly worried Sam Walton; competitive pressure eventually led him to travel the country, scouting retailing alternatives. Despite the conventional wisdom that a full-line discount store needed a population base of at least 100,000, Walton became convinced that discounting could work in small Southwestern towns. In his words, "If we offered prices as good or better than stores in cities that were four hours away by car, people would shop at home."[2] Since Ben Franklin was unresponsive, Walton set out to build his own discount chain.

By 1970, Walton had steadily expanded his chain to 30 discount stores in rural Arkansas, Missouri, and Oklahoma. But the cost of goods sold—almost three-quarters of discounting revenues—rankled. As Walton put it:

> Here we were in the boondocks, so we didn't have distributors falling over themselves to serve us like competitors in larger towns. Our only alternative was to build our own warehouse so we could buy in volume at attractive prices and store the merchandise.[3]

Since warehouses, at $5 million or more apiece, were rather capital-intensive, Walton took the company public and raised $3.3 million.

After 1970, Wal-Mart's discount operations mushroomed. At the end of 1985, Wal-Mart operated 859 "Discount City" stores, with distribution centers in five locations. (*Exhibit 4* traces the pattern of store expansions, and *Exhibit 5* maps Wal-Mart's discounting network at the end of 1985.) In describing the pattern of expansion, David Glass (later Wal-Mart's president and chief operating officer) said, "We are always pushing from the inside out. We never jump and then backfill."[4] During 1986, Wal-Mart planned to add another 115 discount stores to its network.

Well over half of Wal-Mart's stores were still located in towns with populations between 5,000 and 25,000, a higher proportion than the rest of the industry. About one-third of Wal-Mart's stores were located in metropolitan areas or counties that were not served by any of Wal-Mart's competitors. The comparable figure for other discounters in the states in which Wal-Mart operated was 12%. In locations where it

1. E. G. May, C. W. Ress, and W. J. Salmon, *Future Trends in Retailing* (Marketing Science Institute, February 1985).

2. *Business Week*, November 5, 1979, p. 145.

3. *Forbes*, August 16, 1982, p. 43.

4. *Business Week*, November 5, 1979, p. 146.

was alone, Wal-Mart often commanded an unmatched 10%–20% of total retail sales.

Increasingly, however, Wal-Mart had turned to more densely populated areas for growth. The average size of a Wal-Mart store had increased from 42,000 square feet in 1975 to 47,000 square feet by 1980 and 57,000 square feet by 1985. In 1985, new Wal-Mart stores averaged 63,000 square feet—about the same size as the other discount stores being opened in the same regions. Increases in average size reflected, in part, Wal-Mart's development of 85,000- to 100,000-square-foot stores in order to penetrate mid-sized cities and encircle larger ones. Wal-Mart expected that eventually a quarter of its stores would exceed 85,000 square feet.[5]

Wal-Mart's competitors had come to notice that over the 1975–1985 period, population had grown faster in the Sunbelt than in the rest of the United States, and in nonmetropolitan areas than in metropolitan ones. As a result, they had begun to encroach on Wal-Mart's sales territories; K mart, for example, competed in over half of them by 1985. In an attempt to mitigate competition, Wal-Mart was testing 30,000-square-foot stores for towns with populations between 1,000 and 5,000. Company spokespeople claimed that stores of this size would open up 1,000 locations in areas previously considered saturated.

Purchasing and Distribution

Wal-Mart, like other discount chains, had centralized purchasing. Unlike some of its compettitors, however, Wal-Mart did not base orders for most stockkeeping units (SKUs) on centralized sales forecasts. Instead, it used in-store terminals to wire merchandise requests to a central computer. The central computer would either transmit the requests to the Wal-Mart distribution center that supplied the store, or, if stocking levels there were low, reorder the merchandise. Wal-Mart never filled out-of-stock areas with different merchandise.

To expedite deliveries, Wal-Mart's central computer was linked directly to several hundred of its 3,000 vendors. Wal-Mart had developed a reputation for bargaining very hard with them. Unlike some other discounters, Wal-Mart took no more than a fifth of its volume from any one vendor. In 1985, no vendor accounted for more than 2.8% of the company's total purchases.

Only 20% of the inbound merchandise—a smaller proportion than at either Sears or K mart—was shipped directly from the vendors to the stores. The rest passed through Wal-Mart's two-step hub-and-spoke distribution network. One of Wal-Mart's 400-plus truck-tractors would bring the merchandise into a distribution center, where it would be sorted automatically onto another truck and delivered to the store—usually within 48 hours of the original request. Each store received at least three full or partial truckloads a week. Because Wal-Mart stores were packed together, one truck could resupply two or three on a single trip. Any merchandise that had to be returned was carried back to the distribution center for consolidation. Since many vendors operated warehouses or factories within Wal-Mart's territory, trucks also picked up new shipments on the return trip. In the early 1980s, Wal-Mart's trucks were running 60% full on backhauls.

Wal-Mart opened its first distribution center—a 72,000-square-foot facility—at its headquarters in Bentonville, Arkansas, in 1970. The initial cost of that distribution center was $5 million; it was meant to serve 80 to 100 Wal-Mart stores within a 250-mile radius, and it was enlarged as Wal-Mart's store network grew. By 1978, the company's radius of operations had widened to 400 miles. In that year, Wal-Mart opened a distribution center at Searcy, Arkansas, to serve eastern Arkansas and the growing store networks in Louisiana, Mississippi, and Tennessee. Distribution centers were inaugurated in three other locations in the next seven years: Palestine, Texas (1979), to serve the southeastern part of that state; Cullman, Alabama (1983), to serve Tennessee, Alabama, Kentucky, Georgia, and the Carolinas; and Mt. Pleasant, Iowa (1985), to serve Illinois, Iowa, and Indiana. By the end of 1985, Wal-Mart operated 3.9 million square feet of distribution space in five locations. It was scrambling to add another 2.6 million square feet in 1986, primarily in three new distribution centers: Douglas, Georgia; Plainview, Texas; and Brookhaven, Mississippi. Rapid store expansion was the reason: the new distribution centers were needed to contain delivery times and transportation costs and to cope with regional differences in consumer preferences. Ultimately each center

5. *Discount Store News*, December 9, 1985, p. 62.

was meant to serve up to 175 stores within a 150- to 300-mile radius.

This was the same distance that Wal-Mart stores were from their distribution centers in the early 1980s. Wal-Mart's cost of inbound logistics, which it had to shoulder, had then averaged 2% of sales—about half the figure for the industry as a whole. The savings fed directly into gross margins. However, rapid expansion had nudged these costs upward: in 1984, they accounted for 2.8% of sales and in 1985, 4.0%. They were expected to drop back to 3% of sales once the new distribution centers were completed in 1986.

Store Operations

Wal-Mart leased all but 47 of the 859 stores it operated at the end of 1985. Stores were constructed or redeveloped to its specifications by independent contractors. Almost all the store leases could be renewed for 5 to 15 years at the end of their terms. Some of the leases provided for contingent additional rentals based on sales levels. Since 1979, the company had decided to stay out of locations that could not be expanded.

Building rentals accounted for 1.8% of sales in the late 1970s—the lowest level for any major discounter. Two factors had since contained them: (1) an increase in sales per average square foot from $110 in 1979 to $171 by 1985 and (2) the bargain-basement acquisition, in the 1980s, of the leases for 120 Kuhn's Big-K and Woolco stores. Despite these factors, average building rentals had probably edged upward by 0.1% as Wal-Mart moved into larger, more contested towns.

Store hours ran from 9:00 A.M. to 9:00 P.M.; most Wal-Mart stores were open seven days a week. (*Exhibit 6* sketches the layout of a relatively large Wal-Mart store.) Each store had 36 merchandise departments. Store managers were allowed considerable autonomy in allocating space among them, ordering stock, and setting up displays. The ambiance of Wal-Mart stores resembled K mart's: since the mid-1970s, both had launched expensive store-improvement programs to move slightly upscale, although they remained less luxurious than higher-priced discounters such as Caldor, Target, and Venture. More of a Wal-Mart store's gross area was available for selling space because the company's distribution network reduced back-room storage requirements. Inventory turns exceeded 4.5 in 1985—well above the levels posted by other discounters.

On average, 29% of a Wal-Mart store's sales were accounted for by soft goods (apparel, linen, and fabrics), compared with roughly 35% for the industry as a whole. Wal-Mart placed more emphasis on hard goods (hardware, housewares, automobile supplies, and small appliances): these constituted 28% of Wal-Mart's sales but only 22% of the industry's. Hard goods generated more sales per square foot than soft goods (for the industry as a whole, about $150 versus about $125), built up more traffic, and required fewer markdowns. The gross margins on them, however, tended to be lower (about 29% versus 35% for soft goods).

The other important product categories at Wal-Mart were stationery and candy (11% of sales), sporting goods and toys (10%), health and beauty aids (9%), gifts, records, and electronics (5%), shoes (3%), pharmaceuticals (3%), and jewelry (2%). Most discounters had traditionally farmed out the last three categories, in at least some locations, to in-store licensees for fees ranging from 5% to 14% of the licensees' sales. Wal-Mart was no exception: in 1975, nearly all of its shoe, pharmaceutical, and jewelry departments were handled by licensees. Over the next decade, it took over many of these specialty departments—by all accounts, quite successfully—after they failed to match sales gains in other parts of its stores. By 1985, it ran over two-thirds of these specialty departments, and licensee fees accounted for only 0.2% of Wal-Mart's discount sales. Fees from licensing averaged 0.4% of sales for the industry as a whole.

The Wal-Mart system included over 70,000 SKUs—a larger number than most other chains, because Wal-Mart was the primary source of merchandise in many of the rural communities that it served. The average store probably stocked 35,000 SKUs; that number increased with store size. Wal-Mart had led the industry in 1971 by installing a computerized system to track inventory. In 1985 each Wal-Mart store had a computer that tracked sales and performed accounting functions. Full inventories of all stores were kept in the central computer at headquarters; they were updated weekly. A $20 million satellite network was to be inaugurated in 1986 to ease real-time communications between all stores and headquarters and to cap

telephone costs, which had spiraled to $10 million. Industry observers already considered Wal-Mart's reaction time in adjusting inventory to be superior to that of its competitors.

In a major drive to improve productivity, Wal-Mart, like other large discounters, was switching to electronic scanning of the Uniform Product Code (UPC) at the point of sale. This would speed checkouts, bypass paperwork, and simplify inventory management, reorders, and postaudits of merchandising programs. UPC scanning was expensive, however: equipping one store with the capability might cost up to $500,000. Wal-Mart had equipped 25 of its stores in 1983, 66 more in 1984, and another 144 in 1985. In 1986 it planned to install UPC scanning in every new store and in 200 existing ones. The goal, which it shared with major competitors such as K mart, was full conversion by 1988 or early 1989.

Marketing

Branded merchandise, most of it nationally advertised, accounted for a majority—one source said 95%—of Wal-Mart's nonclothing sales. Most of the clothing sold, in contrast, was private label. Approximately 70% of all Wal-Mart merchandise was common to all its stores; the rest was tailored to local needs.

Wal-Mart's marketing theme was emblazoned on the facade of every Discount City: "We Sell for Less." Consumers clearly agreed. According to a survey conducted in 1985 by *Discount Store News* and Leo J. Shapiro Associates, consumers shopped Wal-Mart primarily for the price-sensitive categories of health and beauty aids, housewares, and appliances. They were not as influenced by it in apparel, hardware, and consumer electronics.

Wal-Mart was very competitive in terms of prices. Its store managers had more latitude in setting prices than did their counterparts in "centrally priced" chains such as Caldor and Venture. Goldman, Sachs had compared Wal-Mart's everyday shelf prices with its competitors' in three markets in late 1983 and early 1984.[6] The most competitive market covered the eastern suburbs of St Louis: in one of the suburbs—called Belleville—a Wal-Mart and a K mart were located right next to each other. Wal-Mart's prices there were 1.3% lower than K mart's. K mart priced 9% lower in Belleville than in Fairview, eight miles away, where it competed—at a greater distance—with Venture and Target. The second market, between Dallas and Fort Worth, was somewhat less competitive: Wal-Mart, K mart, and Target were each separated by four to six miles. There, Wal-Mart's prices were 7.6% lower than Target's, and 10.4% lower than K mart's. The final market studied—Franklin, Tennessee, 18 miles south of Nashville—was one in which Wal-Mart had no local competition. Wal-Mart's prices in Franklin were 6% above those in its urban location in Nashville, where it was located right next to K mart.

Wal-Mart's promotional strategy was governed by its philosophy of "everyday low prices." Many discounters, such as Caldor, Target, and K mart, cut prices 20%–30% on selected items nearly every week in order to build traffic, highlight seasonal trends, and control their sales mix. There were numerous costs, though: advertising in local newspapers or catalog mailings to prospective customers, anticipatory buildup of inventories, scheduling snarl-ups, extra payroll costs, and additional markdowns on residual merchandise. To measure the success of a promotion, items had to be counted before and afterward;[7] even this measure was imperfect because many customers deferred purchases at higher everyday prices in anticipation of sales. As a result, a few discounters, such as Hills Department Stores, ran no promotions at all. Wal-Mart fell between these extremes by running 13 promotions a year: one each month except in December, when it ran two. Promotional prices were 10%–20% below everyday ones. By one account, Wal-Mart's sales tables—jammed between regular store fixtures—generated twice as many sales dollars per square foot as those of its competitors.

Wal-Mart's advertising expenditures had averaged 1.1% of sales in the second half of the 1970s. Circulars and newspaper advertisements accounted for the bulk of this figure. Spot TV was the primary nonprint medium used. Television advertising had increased from $1.0 million (14% of the total) in 1977 to $3.7 million (29% of the total) in 1979. Wal-Mart had subsequently stopped disclosing aggregate advertising figures. In 1985, however,

6. Joseph H. Ellis, "Wal-Mart Stores, Inc.," Goldman, Sachs, May 9, 1984.

7. UPC scanning was alleviating this particular problem, because it allowed automatic tracking of sales.

it spent $16.3 million on spot TV, almost entirely in major metropolitan markets. It typically advertised heavily when it entered such a market; for instance, in entering Nashville, it outspent other discounters in the area and then dropped back after it established a presence.

Wal-Mart's terms of sale, like other discounters'. were prim--ily cash-and-carry. Although Wal-Mart did accept MasterCard and VISA, credit transactions accounted for less than 5% of its total sales in 1982. Wal-Mart had a "no questions asked" policy on returns.

In 1985, Wal-Mart was using computer-aided design to develop a program that would suggest a merchandise mix for each store, based on more than 100 factors—including climate, customers' recreational preferences, their ethnic mix, and other demographic factors. Management thought that the increasing diversity of the communities Wal-Mart served made such a program essential.

Human Resources Management

At the end of 1985, Wal-Mart employed over 100,000 full-time and part-time employees. None of them were unionized. Company spokesmen invariably emphasized their importance to the company. The annual report for the fiscal year ending January 31, 1986, was typical. Its cover highlighted the word *people;* the report went on to add, "Wal-Mart's 'Our People Make the Difference' explanation for past success is more than a slogan or a philosophy—it's the very heart of Wal-Mart." Almost all Wal-Mart managers wore buttons that said, "We Care About Our People."

Wall Street analysts agreed that there *was* something different about Wal-Mart's human resource management policies. Top management spent the bulk of the week within Wal-Mart's stores. Employees (officially called associates) were polled for their views on what merchandise to include and how to display it. Several incentives had been installed, including profit sharing and encouragement of employee stock purchases. Store managers' base salaries were supplemented by a percentage of their unit's pretax profits if they exceeded corporate targets. But the program with the most tangible impact on the bottom line dealt with "shrinkage"—a euphemism for pilferage or shoplifting. Shrinkage, which was embedded in the cost of goods sold, dissipated over 2% of most retailers' sales revenues. In the mid-1970s shrinkage ran at 2.2% in Wal-Mart stores as well. Wal-Mart then began passing on half of any reductions in shrinkage in a particular store to the employees there. By mid-1980s, this program and tight inventory control had reduced shrinkage to 1.3% of sales.

Wal-Mart had been named one of the 100 best companies to work for in the United States. This was in spite of rather than because of its pay scales, which were considered tightfisted. Salary and wage expenses accounted for roughly 11.5% of sales in the late 1970s. This figure had declined to 10.1% of sales by 1985. Capital investments to improve labor productivity—such as UPC scanning—were one of the major reasons for the drop.

Administration

Wal-Mart's administrative style emphasized frugality. Corporate offices were cramped and, according to *Business Week* (October 14, 1985, p. 142), "Visitors to Bentonville often mistake Wal-Mart's office building, with its lobby decorated in Early Bus Station, for a warehouse." The administrative style also differed from competitors' in its very heavy emphasis on communication within the company.

Wal-Mart's 12 regional vice presidents were the cornerstones of this communication network; each of them lived in or around Bentonville. Those at K mart or Target, in contrast, would have overseen geographic areas three to four times as large, lived in the field, and, with their regional offices, cost perhaps an extra 2% of sales. Every Monday, each of Wal-Mart's regional vice presidents was flown out to the region in which the 75-odd stores each supervised were located. Through Thursday, these vice presidents visited their stores to gather feedback from store management, employees, and customers. They were flown back to Bentonville for a day-long merchandising meeting on Friday in which they reviewed the week's performance.

On Saturday, the regional vice presidents and 250 other employees, including the chairman or vice chairman, met at 7:30 A.M. to discuss the previous week's results and settle on directions for the coming weeks. One observer described this meeting as "an amalgam of nuts-and-bolts merchandising set against a backdrop of almost

religious fervor."[8] The meeting usually wound up by 11 A.M.; each vice president then got on the phone with seven or eight district managers to relay plans for advertising and merchandising and other pertinent information. District managers, in turn, held a conference call with all their store managers. Before the end of the day, each store manager would have apprised his or her department managers of the latest programs. Once the satellite network was installed, the Saturday morning meeting would be beamed directly to all stores.

As chairman and chief executive officer, Sam Walton continued to play a very active role, at the age of 68, in running Wal-Mart. His days typically began at 6:00 A.M. and stretched into the evening, although he had been known to drop into a distribution center at 4:00 A.M. for coffee and doughnuts with his employees. He still spent three or four days a week on the road visiting stores, and he also met with each new supplier. Sam Walton doubled as chief cheerleader: at store openings, he delivered pep talks from atop a table, and in 1984 he kept a pledge to put on a grass skirt and dance a hula on Wall Street to celebrate the achievement of 1983's profit targets. In April 1986 *Financial World* named him its CEO of the year.

Diversification

Before the 1980s, Wal-Mart had made only one attempt at diversification: it opened two do-it-yourself hardware and lumber stores in the mid-1970s, then quickly closed them. But in 1983 and 1984, it started three new ventures: dot Discount Drug, Helen's Arts and Crafts, and Sam's Wholesale Clubs. By the end of 1985, two dots and three Helen's had been opened. Helen's appeared to be on hold. Although Wal-Mart officials announced that dot had made the transition from an experimental chain into a full-fledged venture, analysts did not think it would contribute significantly to investment, sales, or earnings in the coming decade.

The venture that the analysts *were* excited about was Sam's—a warehouse club. Warehouse clubs had been in existence only a decade but were being hailed as the most exciting retail format since discounting. Warehouse clubs limited their gross margins to 9%–10%, implying prices 20% below those of conventional discounters and supermarkets. Clubs stocked only 3,500 items and tried to unload their merchandise before the payment for it was due—usually within 30 days of receipt. To generate such high turnovers, they located in areas with populations of 400,000 to 500,000, stocked only top-selling items (including food), packaged items in large quantities, and targeted the owners of small businesses and prescreened, low-risk groups of individual customers. Business customers typically had to pay a $25 annual membership fee; individual customers could either pay a $25–50 annual fee and receive the same prices, or forgo the fee and be charged 5% higher prices. The stores themselves were large warehouses—often the size of two football fields—with rudimentary fixtures, limited signage and marking of merchandise, and no salesclerk service, credit, or delivery.

In 1985, warehouse club sales had reached $4.4 billion. They were expected to exceed $20 billion by the early 1990s. Over a dozen companies had jumped into the business; in total, they operated over 100 warehouses at the end of 1985, compared with 43 at the end of 1984. Each warehouse cost between $5 million and $10 million to start. Only two companies had yet seen any return on their investment: (1) Price Company, which had pioneered the concept in 1975, turned its inventory 20 times a year and held a 40% market share, and (2) Wal-Mart's Sam's Wholesale Clubs, which turned inventory about 12 times a year and held a market share slightly under 20%. The other large competitors included affiliates of Kroger, Zayre, and W. R. Grace, and three "independents": Costco, Pace Membership Warehouse, and Wholesale Club. All of them had started by focusing on different geographic areas; none yet matched Sam's warehouse volumes or inventory turnovers, let alone Price's.

In 1985, companies for the first time began to compete in the same locations for warehouse business. This trend was expected to intensify because there were only about 100 metropolitan areas in the United States with populations of half a million or larger. The impact of competition was still a matter for conjecture. As one analyst put it:

> It is not yet clear whether two or more competitors can exist profitably in a single market, or how severely profitability is affected. Because warehouse clubs, as cur-

8. *Discount Store News*, December 9, 1985, p. 44.

> rently structured, depend on memberships—solicited directly to wholesale customers and to "group" members through savings and loan clubs, credit unions and employee organizations—being the first warehouse club to solicit and introduce the concept in a market can be a major competitive advantage.[9]

Wal-Mart had opened its first Sam's Wholesale Club in April 1983 in Oklahoma City. It added 2 more that year, 8 in 1984, and 12 in 1985. (*Exhibit 7* lists the locations in which Sam's Wholesale Clubs operated by the end of 1985.) Although Wal-Mart did not disaggregate its financial data, one analyst pegged Sam's sales at $43 million in 1983, $222 million in 1984, and $777 million in 1985; the corresponding estimates of pretax income were $0.3 million, $5.7 million, and $26.0 million.[10] In 1985, Sam's had lowered Wal-Mart's gross margin by 1.0% of sales and its selling, general, and administrative expenses by 0.6%. In 1986, Wal-Mart expected to add another 18 warehouses to Sam's network.

9. Joseph H. Ellis, "The Warehouse Club Industry: An Update," Goldman, Sachs, January 17, 1985.

10. Joseph H. Ellis, "Wal-Mart: Updated Statistics and Projections," Goldman, Sachs, March 21, 1986.

Sam's mix differed from the mix in Wal-Mart's discount stores, and it bought its merchandise independently of them. Wal-Mart spokespeople acknowledged that they had built up Sam's in the image of the Price Company. They were quick to point out, however, that Sam's did have several distinctive features. It leased its warehouses, trimming the initial investment in each by about $4 million, emphasized soft goods, had begun to promote itself by mailing seasonal flyers to members, and was broadening its base by offering memberships to all Wal-Mart stockholders. Wal-Mart also claimed that because of the company's discounting experience, Sam's was more viable in smaller areas than competing warehouse clubs: as evidence, it cited 1986 openings in Greenville, South Carolina (with a population of 125,000), and Jackson, Mississippi (with a population of 175,000). In mid-1986 management reported that in the three markets in which Sam's operated side-by-side with Wal-Mart discount stores, operating results had been above average because of greater customer traffic.

By 1985, Sam's had built up a broader national presence than any of its competitors, including the Price Company—which was still concentrated in California and Arizona. Analysts projected that Sam's locations would expand to 100 by 1990, its revenues to $6.5 billion, and its pretax income to $260 million.

Exhibit 1 Corporate History ($ in millions)

	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
Operating Flows										
Net sales	$479	$678	$900	$1,248	$1,643	$2,445	$3,376	$4,667	$6,401	$8,451
License fees and other income	5	8	10	10	12	18	22	36	52	55
Cost of goods sold	353	504	661	919	1,208	1,787	2,458	3,418	4,722	6,361
Operating, selling, general and administrative expenses	95	135	182	252	332	495	677	893	1,181	1,485
Interest cost	5	7	10	13	17	31	39	35	48	57
Taxes	15	20	27	33	44	66	100	161	231	276
Net income	16	21	29	41	56	83	124	196	271	327
Balances										
Current assets	99	151	192	267	345	589	721	1,006	1,303	1,784
Property, plant, equipment, and capital leases	68	101	131	191	246	333	458	628	870	1,303
Current liabilities	43	75	99	170	178	340	347	503	689	993
Long-term debt	19	21	26	25	30	105	106	41	41	181
Long-term obligations under capital leases	41	59	72	97	135	154	223	340	450	595
Common shareholders' equity	$64	$96	$127	$165	$248	$324	$488	$738	$985	$1,278
No. of Stores at End of Period										
Discount stores	153	195	229	275	330	491	[illegible]	642	745	859
Sam's Wholesale Clubs	0	0	0	0	0	0	0	3	11	23

Source: Annual reports
Note: Numbers may not add due to rounding, deferred income taxes, etc.

Exhibit 2 Financial Performance of Selected Discounters, 1974–1984 (%)

	Return on Equity	*Sales Growth*	*Earnings-per-Share Growth*
Dayton-Hudson	20.6%	17.0%	18.8%
Heck's	14.1	11.7	NM[a]
K mart	15.9	14.3	13.9
Rose's Stores	14.1	11.2	22.5
Wal-Mart	33.0	40.3	38.8
Zayre	13.1%	11.5%	21.2%

Source: *Forbes*

a. NM indicates *not meaningful.*

Exhibit 3 The Industrywide Economics of Discounting in 1984 (% of net sales)

Net sales	100.0%
License fees and other income	1.1
Cost of goods sold	71.9
Payroll expense	11.2
Advertising expense	2.3
Rental expense	2.2
Miscellaneous expense	7.6
Operating income	5.9
Net income	2.7%

Source: *Operating Results of Self-Service Discount Department Stores* (National Mass Retailing Institute, August 1985).

Exhibit 4 Geographic Distribution of Wal-Mart's Discount Stores at Year-End, 1976–1985

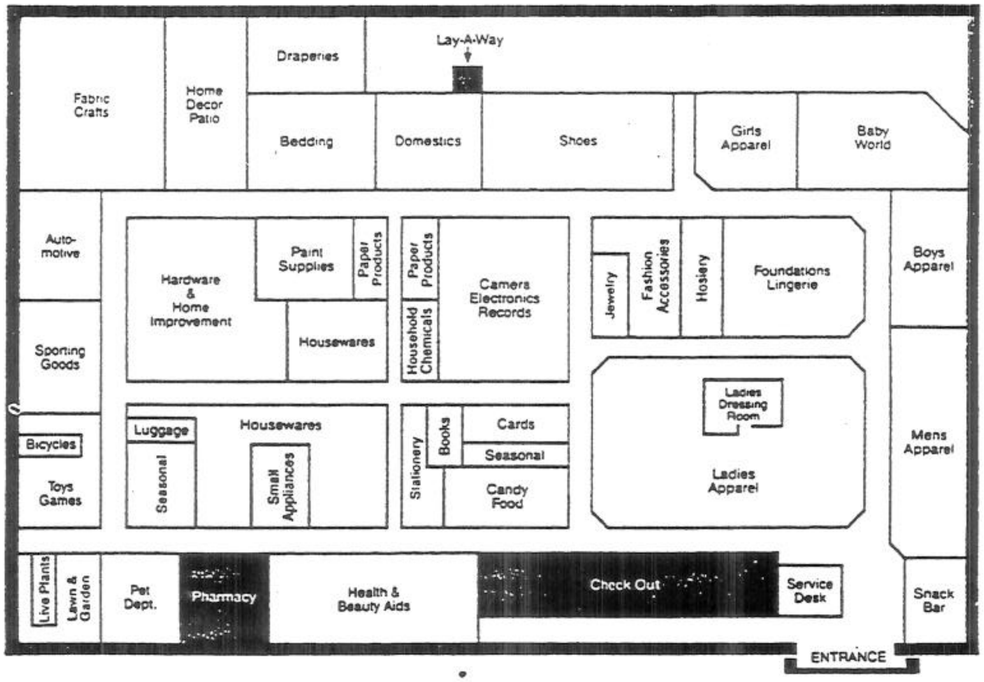
State	*1976*	*1977*	*1978*	*1979*	*1980*	*1981*	*1982*	*1983*	*1984*	*1985*	*% of Total Discount Stores (1985)*
Alabama	0	0	0	1	9	37	40	42	47	51	23%
Arkansas	47	50	54	57	64	69	70	71	70	71	45
Colorado	0	0	0	0	0	0	0	0	0	2	2
Florida	0	0	0	0	0	0	1	8	23	37	9
Georgia	0	0	0	0	0	6	7	16	28	39	17
Illinois	0	6	11	16	20	24	30	33	37	47	12
Indiana	0	0	0	0	0	0	0	1	2	6	2
Iowa	0	0	0	0	0	0	0	2	6	13	8
Kansas	7	8	9	10	16	19	20	24	28	31	21
Kentucky	2	2	3	4	7	28	28	35	40	43	22
Louisiana	4	6	6	7	12	20	26	43	44	49	22
Mississippi	7	12	13	18	20	25	27	28	28	34	27
Missouri	44	57	61	64	71	76	78	79	82	90	40
Nebraska	0	0	0	0	0	0	1	1	4	8	9
New Mexico	0	0	0	0	0	0	0	1	2	11	17
North Carolina	0	0	0	0	0	0	0	1	1	1	0
Oklahoma	29	34	42	46	48	56	59	66	69	71	36
South Carolina	0	0	0	0	0	18	18	18	23	25	19
Tennessee	7	10	10	17	18	54	56	59	67	67	30
Texas	6	10	20	36	45	59	90	114	143	160	27
Virginia	0	0	0	0	0	0	0	0	1	1	1
Wisconsin	0	0	0	0	0	0	0	0	0	2	2
Total	153	195	229	276	330	491	551	642	745	859	18%

Source: Annual reports

Exhibit 5 Wal-Mart's Discounting Network at End of 1985

Source: Annual reports

Exhibit 6 Layout of a Large Wal-Mart Store in Festus, Missouri



Source: *Discount Store News*, December 9, 1985.
Note: Size of store is 85,000 square feet.

Exhibit 7 Locations of Sam's Wholesale Clubs

State	*Locations in December 1985*	*Additional Leases for 1986*
Alabama	Birmingham	–
Arkansas	Little Rock	–
Colorado	–	Colorado Springs
Florida	Jacksonville	Orlando
Illinois	–	East St. Louis
Kansas	Wichita	–
Kentucky	–	Louisville
Louisiana	–	New Orleans (2)
Mississippi	–	Jackson
Missouri	Kansas City	–
	St. Louis	–
Oklahoma	Oklahoma City	Oklahoma City
	Tulsa	–
South Carolina	Charleston	Greenville
Tennessee	Knoxville	Memphis
	Memphis	Nashville
	Nashville	–
Texas	Corpus Christi	Amarillo
	Dallas–Ft. Worth (4)	Dallas
	Houston (3)	El Paso
	Lubbock	Houston (2)
	San Antonio (2)	Waco
Total	23	17

Source: Annual report

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14

NEC

In June 1985, NEC entered the supercomputer business by introducing the SX-2, whose impressive design and performance stunned supercomputer and mainframe manufacturers. In June 1990, NEC delivered the first units of the SX-3, whose performance made it the world's fastest computer. Through these product introductions, NEC established itself as a technical leader in the supercomputer industry.

These striking successes were achieved through the completion of a series of projects that built critical competences in the computer and computer engineering divisions (see **Exhibits 1** and **2**). The packaging engineering group, led by Toshihiko Watari, played a critical role in these efforts by introducing a number of novel technologies that allowed the supercomputers to achieve their impressive performance. In January 1991, however, the future of the supercomputer industry looked uncertain. New computer concepts were threatening established competitors, offering unprecedented levels of performance for very low cost. In particular, NEC managers were expecting that parallel computers would soon replace the more traditional serial computers that made up the bulk of current supercomputer sales.

This was the environment in which Watari, now assistant general manager of the computer engineering division, was considering the packaging group's future strategy. NEC's senior management had indicated strong interest in exploring novel supercomputer concepts that would make many of the existing capabilities of his packaging group obsolete. Watari was currently trying to conceptualize the evolution of his group of engineers over the next ten years. He was concerned about what capabilities would be needed and what selection of projects could be used to build the necessary skill set.

NEC Corporation

NEC was founded in 1899 with both U.S. and Japanese capital; U.S.-based Western Electric held an initial share of 54% in the company. In 1932, NEC became a member of the Sumitomo Zaibatsu. NEC started its business by importing Western Electric products and later began to manufacture telephones and manual switchboards. Even after World War II, NEC's business was confined to the telecommunication equipment market, depending on the demand from Nippon Telegraph and Telephone Public Corporation, the predecessor of the present NTT. Since the middle of the 1950s, NEC has expanded its business to serve private customers and international markets, diversifying its products to include computers, electronic devices, and home appliances.

Professor Marco Iansiti prepared this case with the assistance of Hyungoh Lee as the basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation. Proprietary data have been disguised; the case does not reflect actual NEC plans.

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In 1977, Koji Kobayashi, president of NEC, declared 'C&C' – the seamless integration of computers and communication – to be the company's fundamental strategic intent. His vision of a world in which the computer and telecommunication industries would merge deeply influenced the organization's direction, providing a base for strategy and for research and development. In 1985, NEC became the seventh largest company in the world telecommunication equipment market, the seventh in the world computer market, and the first in the world semiconductor market.

Exhibit 2 illustrates the company's organizational structure in 1989. NEC was aggressive with regard to investment in R&D. Typically, its R&D budget was about 10% of sales, 90% of which was allocated to the business groups and 10% to basic research. However, compared to many other competitors that during the 1980s had focused on *either* the computer *or* the telecommunication businesses, NEC's R&D effort was spread relatively thin. The company's broad business focus put a real premium on the productivity of its R&D resources. To achieve this, NEC emphasized the selection of a few critical technical drivers which would build "core" technical capabilities that could be leveraged across multiple businesses. Additionally, the company focused on nurturing efficiency in its product development process and in the transfer of new concepts from the science base to the market.

NEC's Computer Business

In 1954, recognizing the necessity of enormous calculation in the design of an electronic circuit network, NEC's telecommunications division began to conduct research on computers. In 1958, it succeeded in developing its first commercial computers, the NEAC-1101 and 1102, and in 1965 announced the NEAC 2200, aimed at competing with the IBM 360. The products were successful and NEC became the leader in computer sales among Japanese customers during the 1960s. Even in the late 1960s, however, the technical level of Japanese computer producers was far behind that of U.S. competitors. In order to nurture Japan's computer industry, the Japanese government initiated a number of supportive policies, one of which integrated the six leading companies into three groups: Fujitsu–Hitachi, NEC–Toshiba, and Mitsubishi Electric–Oki Electric. While the Fujitsu–Hitachi group took the strategy of developing computers compatible with IBM's computers, the NEC–Toshiba group decided to develop non-compatible computers, which later crystallized as the ACOS series in 1974. Toshiba gave up the mainframe business in 1978, leaving only NEC to continue developing the ACOS series (which included all levels of computers, from large-scale to small-scale). By the late 1980s, Japanese mainframe and supercomputer manufacturers had acquired a substantial share of the global market (see **Exhibit 3**; Japanese market share is approximately evenly split between Fujitsu, Hitachi, and NEC).

Since the 1960s, NEC has offered not only mainframe computers, but also office computers, minicomputers, personal computers, and workstations. Because NEC's mainframe computers were incompatible with IBM's, NEC's success was limited to a market share of about 20% in Japan in 1990. In the market for office computers and PCs, however, NEC was strong, holding more than 50% of the Japanese market in 1990. NEC was well-known in Japan for its refusal to make computers compatible with the IBM PC.

The Computer as a System: Architecture and Performance

Computers are complex systems composed of a large variety of components, such as transistors, integrated circuits, and circuit boards. Their basic function, however, is relatively simple. A computer is a problem solving tool. The problems are formulated or "programmed" in a set of instructions (such as adding or comparing numbers) that are executed by the computer's "processor." The basic architecture of a computer is made up of three levels of components, as shown in Figure 1. These are the integrated circuits (ICs), the IC package or modules, which house the integrated circuit, and the circuit boards, which are used to connect the IC packages to each other.

In the 1990s, the architecture of a computer processor varied substantially from computer to computer. In a personal computer or workstation, the processor was contained within a single integrated

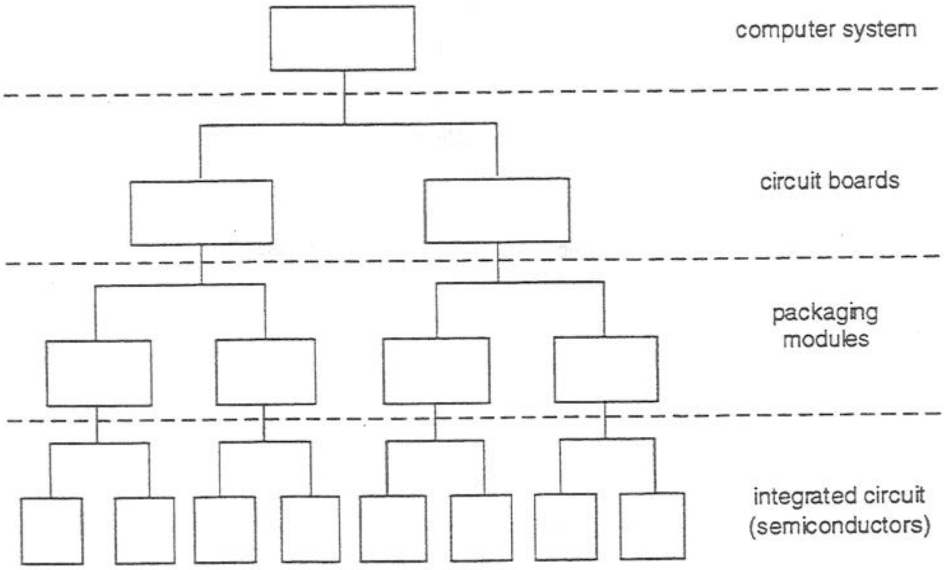


Figure 1: The different levels of packaging and interconnection in a computer.

circuit: the microprocessor. In mainframes and supercomputers, on the other hand, the processor was distributed among dozens of integrated circuits. This critical difference between personal computers and mainframes was driven by the type of semiconductor technology employed. The higher performance mainframes and supercomputers used "bipolar" semiconductor devices that were intrinsically more than ten times faster than the "CMOS" devices used in personal computers and workstations. On the other hand, bipolar devices were more difficult to fabricate than CMOS devices and tended to consume much more electrical power, generating more heat. The convenient properties of CMOS devices allowed manufacturers to fabricate them much closer together than bipolar devices, and allowed for the design of the microprocessor on a single integrated circuit (or "chip").

In 1991, the design of microprocessor-based computers was usually quite different from that of other computers. In the case of a microprocessor, the critical connections were on the same chip. Thus the design of integrated circuit packages or modules was simple because they only needed to house and protect the integrated circuit. For a mainframe or supercomputer processor, millions of critical connections needed to be made between individual integrated circuits, making the modules critical to computer performance. This necessitated the design of very sophisticated modules and circuit boards. The large amount of heat generated by bipolar devices also created stringent requirements for mainframe and supercomputer packaging engineers. (**Exhibit 4 illustrates** processors for a mainframe and for a personal computer.)

Computer performance can be assessed by the number of instructions the processor can execute, on average, per unit of time. The most popular measure used in assessing performance across different computer models is "Millions of Instructions Per Second" (MIPS). Performance can be divided further into three basic elements: the time that the processor takes, on average, to go through one cycle (the "cycle time"), as well as the number and the type of instructions that can be executed during that cycle. The cycle time is linked directly to the properties of the hardware subsystems (i.e., the physical characteristics of the transistors and interconnect structure), while the number and type of instructions executed in each cycle are related to the way the system is organized and the hardware is used (i.e., how many different processors the machine uses, their instruction set, the average machine workload, and so forth).

The different factors influencing computer performance are shown in Figure 2. Improving each factor would appear roughly comparable from a customer's perspective, but would involve very

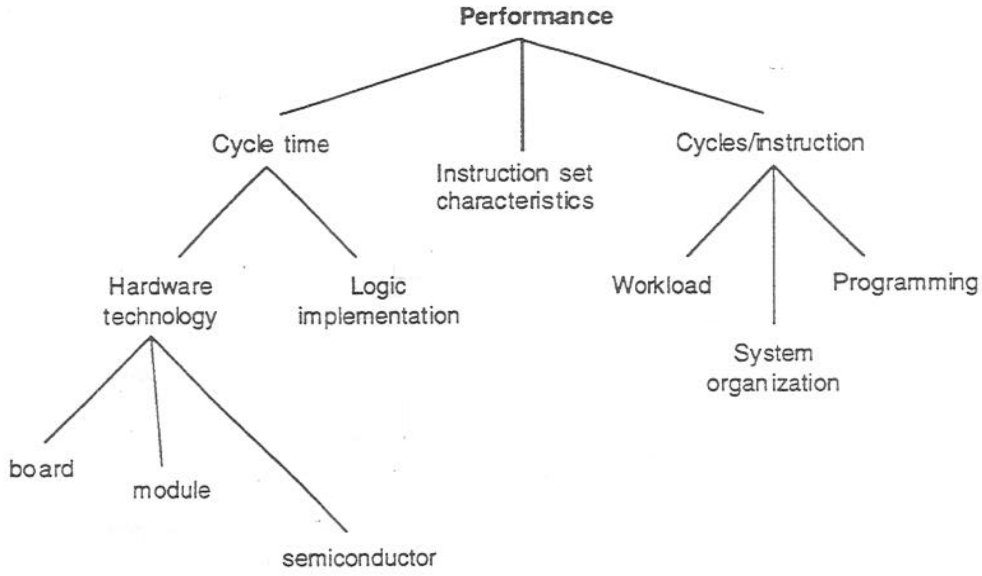


Figure 2: The determinants of computer performance.

different types of expertise and capabilities. The variety of computer systems that evolved in the second half of the 20th century reflected different choices with respect to the relative importance of the branches of the diagram in Figure 2. In the 1990s, there were three basic types of computer: personal computer/workstation, mainframe/supercomputer, and parallel computer. Each of these "dominant designs" represented fundamentally different architectural choices.

In personal computers, software design, workload allocation, system organization, and programming were largely uniform between different computer producers; most were based on MS-DOS and Microsoft Windows software. On the hardware side, the advent of microprocessors had located the computer's most important functional elements on a single chip, rendering the board, card, and module design largely irrelevant to performance. Thus, remaining performance improvement possibilities were in improvements in the speed of the semiconductor devices, under the control of the microprocessor designer. In the early 1990s, therefore, personal computer system development did not hinge on deep expertise at the level of board or module design.

Workstations and personal computers were similar in architecture. One major difference, however, was that the former did not have a clear and proprietary software standard. This allowed companies such as Sun and Silicon Graphics to improve performance by optimizing software operating system design, thereby creating a need for the development of these capabilities in a workstation manufacturer. A second difference was that most workstations relied on microprocessors with a different, "reduced" instruction set (RISC). This made them more efficient in performing certain numerical applications.

The development of mainframes and supercomputers was very different. As mentioned above, the design of the module and circuit board was essential to performance. In mainframe and computer R&D organizations, therefore, the fundamental capabilities associated with module and board design were valued highly.

In 1991, parallel computers were at a different stage in their technological life cycle than personal computers and mainframes. No dominant, well-defined design had emerged. While no one knew for sure how parallel computer architecture would develop in the future, everyone believed that its basic characteristics would resemble neither the personal computer nor the mainframe model. The computer would be distributed over many individual processors, all working in parallel. While each processor would probably fit on a single chip, designing a computer would involve the integration of

thousands of processors, possibly through complicated modules or boards. This would put a premium on the capability to design computer packages. The specific capabilities needed would be different from those involved in mainframe design, however. In contrast with mainframes, industry experts expected that future parallel computers would employ CMOS semiconductors. Since CMOS devices consumed much less heat than bipolar devices, experts believed that the design of packaging modules for parallel computers would be easier than for supercomputers and mainframes. In 1991, existing parallel computers were cooled by air rather than water, for example. On the other hand, experts also believed that as time progressed module design for parallel computers might be characterized by newly discovered challenges, such as the capability to package a very large number of integrated circuits in a reliable fashion.

Computer Development at NEC

Three main groups were directly involved in the development and production of computer hardware at NEC: the Electronic Data Processing Planning (EDP) Office, the Computer Engineering Division, and the Computer Division (see **Exhibit 2**). The EDP Planning Office had responsibility for market research and product planning. The Computer Engineering Division had responsibility for the bulk of product development activities, from product concept development to prototype production, including both software and hardware development. The Computer Division was responsible for the production of computers, including process development activities.

The Packaging Engineering Department was responsible for developing computer packaging modules for all product lines and was loosely divided into two groups in 1991. One was responsible for high-end computers (which used "bipolar" semiconductor technologies) such as supercomputers and large mainframes. The second group was responsible for lower-end computers, such as personal computers and workstations, which used cheaper and easier to manufacture CMOS semiconductor devices. The two groups were focused on different practices, motivated by the fundamental differences between the businesses they served. While the bipolar group emphasized the development of novel packaging concepts that would push the performance of the computers to the limits, the second group was mainly concerned with cost reduction and miniaturization of existing concepts. While the first group designed and developed many packaging components in house, the second group worked more extensively with external suppliers, which usually provided NEC with complete packaging solutions. The groups were located in Fuchu in the same complex as one of the central production facilities of the Computer Division.

The bipolar packaging group at NEC had driven the detailed design and development of high-end packaging systems for the company for several computer generations. The group's small size (less than 40 engineers in 1991) and the attention of the project managers had provided its members with broad exposure to a wide variety of tasks. Their approach was to have project members continuously involved in a development project; there were no hand-offs in the middle of a project. Although a small number of production engineers from the Computer Division would gradually become involved in the projects, as these progressed, the tradition was that whoever started the project would see it through to the end. As a result, individual packaging group members had an intimate understanding of past production processes, system-level design considerations, and a wide variety of technical approaches. Akihiro Dohya and Tatsuo Inoue, two members of the group, were a good example of this. They had joined NEC right after completing college. In 1991 they were about 38 years old and had already been involved in more than half a dozen major product development projects in the packaging group. Through this experience, their initial background in electrical engineering was complemented by detailed knowledge of the production organization's existing manufacturing capabilities, the system design considerations in NEC supercomputers, and typical customer preferences and requirements.

There were five basic levels in the packaging organization: engineer, supervisor ("shunin"), engineering manager ("kacho"), senior manager ("bucho"), and general manager ("jigyobucho"). Watari, at the general manager level, filled a position of both technical and managerial leadership.

He had written many technical papers on the development of high speed packaging systems and was closely involved in the technical decision making process. His technical opinion was greatly respected. His involvement in running the details of the projects had decreased over the last ten years, however, as his set of responsibilities had broadened to include leadership of both packaging groups. Dohya and Inoue had recently become engineering managers and had taken over many of the day-to-day management tasks. Dohya and Inoue had also contributed to a number of technical publications over the past ten years. Their technical judgment had become very highly valued by engineers throughout the organization.

Inoue described the development process:

> We only have one weekly meeting scheduled for about 3-4 hours on each project. On the other hand, there are a lot of informal discussions on the details of the projects every day. In this way, many of the technical options gradually bubble up from the bottom of the organization. By the time Watari-san gets involved, we have developed many options and performed some experiments to investigate them. At that point, the decision-making process goes into a top-down mode. The final decisions are made at big meetings in which everyone participates, one of the options is selected, and the results then influence all the details of the next round of development. Watari-san has great influence in these meetings.

Although packaging engineers were not necessarily dedicated to a single project (and would often work on two simultaneously), there was great continuity between assignments. Individual group members retained full responsibility to implement the choices they had made in the early stages of the project and see the repercussions of their decisions. They first worked on joint projects with suppliers or the central research laboratories to investigate new scientific approaches, and then on product and process feasibility and defining new product specifications. They built prototypes themselves with the aid of about a dozen highly skilled technicians. They then worked side by side with the production engineers to transfer the process to the plant and optimize the yield. The experience gathered in problem solving activities in each project was carefully nurtured. Inoue explained:

> We really value individual experience, but no individual can remember everything. So we document everything along the way. Some people in the group write reports every day. These are stored chronologically. Lately they are put in a database with key words. They also have reports from every single meeting they held. There is a central file which contains every individual's report.

The packaging engineering group worked closely with the central research laboratories in Kawasaki, about one to two hours away from Fuchu. Members of the research and development group had been active in materials research for many years. The group was composed of about half a dozen scientists, many with a Ph.D. degree. Dr. Yuzo Shimada, for example, had a degree in chemistry and fourteen years experience in research at NEC. He had performed research on new ceramic materials and processing techniques (a few of the concepts had been implemented in products). He had also worked with scientists at supplier companies to jointly develop new concepts. The facilities at the central research laboratories in Kawasaki enabled the researchers to perform bench-scale experiments on the properties of the new materials. While they would occasionally build functional experimental prototypes of packaging systems, most of their efforts were aimed at developing new materials and processes that would have application in novel systems.

The differences between the objectives and agenda of the packaging engineering group were clearly delineated. In contrast with the central research laboratories, the packaging engineering group was focused on designing a working, manufacturable product. Watari and the engineers of the packaging group would participate in and influence early R&D activities and would lead efforts to select and develop the technologies necessary for the evolution of NEC's high end computers. While the role of the R&D group was to offer a large breadth of technical possibilities, the packaging group

focused the investigations on developing a product concept, selecting the most promising alternatives, and integrating them into a manufacturable product.

An average figure in the mainframe and supercomputer industry for the resources involved in the development of a high performance packaging system were about 500 to 1000 person years, in the 1980s, depending on the novelty and complexity of the project. The typical time taken by a project in the concept development stage was typically about 1 to 2 years. The time involved after concept selection, until the end of the development process, ranged from 4 to 6 years. NEC's packaging group compared favorably with these industry average figures.

The Development of the Supercomputer Packaging Systems

The sequence of projects that established NEC in the supercomputer industry were envisioned in the late 1970s by a group of senior managers. Dr. Kanai, a managing director of the company, and Mr. Murano, who led the computer engineering division, were the original champions of the plan. Their aim was to use the development of the supercomputer series as a technical driver for the corporation, using the projects to develop a new set of technical capabilities that could then be infused into other NEC businesses. Dr. Kanai, in particular, believed that the development of high performance packaging modules would be critical to achieving superior computer performance. His vision was realized by the packaging engineering group through the development of a multi-layer substrate based on "polyimide" materials (see **Exhibit 5**). The project is representative of NEC approaches to technology development.

Development of the SX-2 Packaging Module

Advances in polyimide material technology had their foundations in research efforts performed in the late 1970s (see **Exhibit 6**). Conscious of the pressure on conventional ceramic materials that future performance requirements would bring, engineers in the computer engineering division began exploring the technical potential of polyimide materials for high performance packaging in joint ventures with two suppliers: NJK in Japan, and Integrated Chemicals in the U.S. The new materials had very attractive electrical properties, allowing faster transmission of signals and higher density interconnection patterns, for example. Because NEC was a late entrant in the supercomputer industry, Kanai and Murano felt that challenging performance targets would be necessary to overtake the current industry leaders. The new materials fit this strategy.

The advantage of polyimide materials was that they would allow much faster transmission of electrical signals between integrated circuits. The basic idea was to use polyimide as an insulator between patterned metal lines that made the most critical electrical connections between integrated circuits. The polyimides would be deposited in thin films over a base substrate which would provide a solid structure and some additional layers of connections (see **Exhibit 5**). The base substrate would be made of traditional ceramic packaging materials which had desirable thermal and mechanical properties. But ceramic materials also tended to have a grainy surface and a relatively dusty, messy production process. These characteristics would be a serious obstacle to the introduction of the polyimide thin films, which would require high precision alignment techniques and a clean-room environment. While the technical challenges appeared quite significant, Watari and other managers saw the electrical performance advantages possible with the polyimide materials as an opportunity for NEC to catch up and overtake established industry competitors such as Control Data and Cray Research.

As reports from the joint ventures began to arrive, the promise of the new materials was confirmed. It was also clear, however, that the current composition, properties, and fabrication process would have to be re-engineered to account for the properties of existing ceramic substrates. Additionally, ceramic materials and their production process would have to be substantially redesigned to accommodate the stringent requirements of the polyimide.

The SX-2 supercomputer project was started in 1980 (see **Exhibit 6**). The targeted shipping date was 1985, leaving less than five years for the entire project. The first customer had already been identified (a university laboratory) and had been involved in developing specifications. Two groups within NEC had been particularly active in the early discussions of new packaging concepts for the supercomputer: the central research laboratories and the packaging engineering group. During 1980 and 1981, managers and engineers of both groups met repeatedly to discuss concepts for the supercomputer package. The groups had worked together frequently and enjoyed a close and easy-going relationship.

In 1980, the packaging engineering group of NEC's computer division was hard at work developing the packaging module for a new mainframe computer, the ACOS 1500. The group at the time was quite small, consisting of about two dozen young engineers. Some had only been out of university for a few years, although many had been involved in the development of the previous generation mainframe, the ACOS 1000 system. Both the ACOS 1000 and 1500 projects had involved considerable technical challenges. Some of the group members had also been involved on a part time basis in the polyimide joint ventures with NJK and Integrated Chemicals and had strongly influenced the direction of the early research efforts.

Watari's packaging engineering group naturally took leadership in setting the direction of the SX-2 project. Although the joint ventures indicated significant potential, they felt the risks were too high to focus on a single approach. Packaging engineers and R&D specialists thus decided that four types of packaging concepts should be pursued in parallel (see Table 1). The first approach involved the development of a module that incorporated polyimide thin films overlaid on a base ceramic substrate. The second approach entailed developing a "cofired ceramic substrate," imitating a concept recently developed by IBM. The third approach was quite revolutionary and included a novel "glass" ceramic material that had attractive properties but had never before been employed in this type of application. The fourth approach was a simple extension of the existing NEC concept and did not involve the development of any novel materials, although its performance would fall somewhat short of the initial objectives.

	Approach 1	Approach 2	Approach 3	Approach 4
Description	Polyimide thin film on ceramic substrate	Cofired ceramic	Glass ceramic	Conventional ceramic thick film
Characteristics	Primary approach; use of polyimide would be a first in this application	Approach pioneered by IBM and first introduced in 1979	Novel material, currently being explored at various research labs but not yet implemented	Approach used in the ACOS 1500
Advantages	Best electrical response, leading to high computer speed	Best thermal characteristics; proven concept (in a different company)	Best combination of thermal and electrical characteristics.	Proven approach at NEC
Disadvantages	Novel approach, never before implemented; part of the production process would have to be completely redesigned	Lower electrical performance; expertise not within NEC	Novel approach, never before implemented; most of the production process would have to be completely redesigned	Lower performance

Table 1: The four approaches considered in NEC's SX-2 project.

Project responsibilities were assigned to a number of groups. The first approach, utilizing polyimide technology, was to be led by Watari's packaging engineering group and was given the greatest priority and the most resources. A few engineers from NJK would be involved on a part time basis to help with the polyimide materials. The second approach, the cofired ceramic, was subcontracted to Nagano Ceramics, a supplier. The third and fourth approaches were assigned to the

central research laboratories. Shimada took leadership in the glass ceramic effort. The polyimide technology was seen as a long term opportunity for the company, defining a range of technological possibilities that could be implemented in a sequence of future projects over more than a decade. The other approaches were considered backups, although the third was thought to have significant value for future generations as well.

During 1981, Dohya, Inoue, and other members of the packaging engineering group began to perform feasibility studies for the polyimide thin film approach. They initiated discussions with members of the central research laboratories, material suppliers, system engineers, and integrated circuit designers. They also investigated possibilities through bench-scale experiments. They quickly made many physical models of the module assembly to investigate the characteristics of the new materials. Dohya felt strongly about the importance of subsystem-level models and prototypes:

> In my opinion, material performance can only be evaluated at the subsystem level. You cannot examine performance using elements. You must make subsystems using the material and then check things like reliability and functionality. It is the most effective way to test anything ... basically make some substrate samples, build a fairly complete module, and see how it works.

The resources of the packaging group were clearly stretched at this time. The ACOS 1500 project was still going at full speed: the production process was being refined at the plant, and yield improvement activities had started in earnest to meet the scheduled product introduction date in 1982. During this time, engineers working on the SX-2 project also retained responsibilities for the ACOS 1500. Dohya recalled spending long days in the plant refining the production process for the ACOS 1500 and, frequently on the same day, working on feasibility studies for the SX-2:

> It was a tremendous amount of work. Ramping up the ACOS 1500 package needed a lot of time. At the same time we were developing options for the SX-2. It was hard to do both simultaneously, and we had a lot of really long days. The work on both projects was fundamentally very different. One was in the plant, and the other was in the lab. There was a lot of excitement around the SX-2, however, which helped.

In October 1982, the project was officially approved by NEC senior management and the level of resource allocation increased. The number of people involved from the packaging group rose from five half-time engineers in 1981, to about a dozen engineers and ten technicians in 1982. The group's involvement in the SX-2 project increased as the ACOS 1500 project began to wind down. Between 1983 and early 1985, the allocation level of packaging engineers and technicians remained about the same, although the team was gradually joined by twelve production engineers from the Fuchu plant. As the effort continued, confidence in the polyimide materials continued to grow.

In 1983, the group constructed many partial prototypes of the new packaging system to assess production yield. The yield of the polyimide thin films was investigated at each stage of the fabrication process, between the deposition of each layer. In this way, before the full prototyping process had begun, there were sufficient data (on yields, types of defects, causes of defects, and so forth) to give confidence in an eventual high process yield. By November 1983, reliability testing had begun, and confidence had grown to the point that the second and third major design approaches were dropped (the fourth was still kept as a backup).

Reliability tests were continued during 1984, leading to substantial changes in the composition of the polyimide. Watari's group constructed the first complete prototypes in March. They built more than one hundred modules. Watari remembered fabricating a batch and testing it until a major defect was encountered; knowledge gained from analyzing the causes of the defect was then used to construct a second batch. The first batch, now only partially functional, was used to conduct additional tests. The group went through many such iterations, an approach Watari described as "thinking while running." Watari's group tested a wide variety of design options with the prototypes, gradually refining their

design. By mid summer, the fourth design approach was dropped. Commitment to the polyimide approach was now complete.

The module design had achieved the integration of a number of novel techniques and approaches. The incompatibilities between ceramic and polyimide had been resolved by refinements to the composition of the materials and by a large number of subtle production process changes. The types of problems encountered during the project indicate the complexity and subtlety of the development task. For example, during the tests on complete prototypes, Inoue found that the substrates built with five layers of polyimide would occasionally exhibit slight cracks, impairing the module's reliability. This problem had not manifested itself on partial prototypes, which had only been coated with three layers of polyimide. Inoue remembers fabricating many test samples using production equipment to pin down the exact processing causes of the problem. After two weeks of intense efforts, he found that changing from three to five layers exacerbated the effect of stress created by very slight nonuniformities in the polyimide film. The nonuniformities in the material were in turn caused by its interaction with an important solvent used in the fabrication process. To solve the problem, Inoue worked with experts in the central research laboratories and NJK to alter the composition of the polyimide. This problem was considered by Watari to be one of the most critical encountered in the project.

Going Beyond the SX-2

In early 1985, before the SX-2 project was completed, engineers in the packaging group began adapting the polyimide-based packaging approach for the next generation of mainframes, the ACOS 2000, to be shipped at the end of 1986. Soon thereafter the SX-3 project was also begun, on an informal basis, with discussions about how the SX-2 concept could be extended to provide higher performance. As seen in the ACOS 1500 project, engineers were again allocated on two projects at the same time, facilitating the transfer of knowledge from project to project. Dohya recalled the experience:

> It was a lot of work and stress to do all these things at once. However, in the SX-3, we could fix all the things that we had done wrong on the SX-2. There are a lot of examples of this. In the SX-2 project, for example, we decided very early to mount the chips at a certain distance from each other. The chips could not be aligned with the pins at the bottom of the substrate, which, as it turned out, caused problems in the power distribution connections. We immediately fixed this when we did the SX-3.

The first SX-2 was shipped in June 1985. By then, the overall number of packaging engineers involved had risen slightly to about twenty five people working on the three projects: scale up of the SX-2, development of the ACOS 2000, and concept studies for the SX-3. The ACOS 2000 was introduced on time at the end of 1986, exhibiting the fastest computer hardware in its industry segment.

Early 1987 marked the official start and concept approval of the SX-3 project. By this time, the bulk of engineers in the packaging group had participated in 2 or 3 projects, with full responsibilities ranging from concept investigations to product introduction. This level of experience reflected itself in many of the design approaches taken by the organization. In contrast with the SX-2 project, which had few potential customers at the start, a solid demand for the SX-3 was established even before the project was started. This deeply influenced the character of the project. As described by Watari:

> In the SX-3 project, when the module design was finished it had to be perfect. This was quite difficult. We really only had a couple of years to finish the design. Under such a constraint, we needed a lot of experience to make a perfect product. For the SX-3, we had to know what types of materials would be needed to achieve high yields and to reduce cost, as well as what types of structures would make a reliable design. Luckily, at this point we had experience through the projects we had conducted. The SX-2 was especially useful. Thankfully, almost all of the engineers that had worked on the SX-2 went on to the SX-3 project.

The approach succeeded. While the SX-3 retained essentially the same basic technologies developed in the SX-2 project, the new packaging module included forty times the transistors of the earlier model. In June 1990, NEC delivered the first unit of SX-3, the world's fastest computer, surpassing existing supercomputer models in performance and cost.

As an important additional result, by 1991, many of the technologies pioneered in the SX-2 project had been transferred to other product lines, ranging from personal computers to digital switches. The identification of applications in the telecommunication environment was a particularly critical objective of members of the R&D group. Many of the original scientists that had helped out on the SX-2 project were now involved in applying the concepts to the design of telecommunication equipment.

Trends in High Performance Computers in the 1990s

By 1991, the market for mainframe computers had become saturated. The very existence of mainframe computers as a viable product was under threat from cheaper substitutes such as workstation networks. In contrast to mainframes, the market for supercomputers was maintaining a steady growth predicted to be close to 10% per year during the 1990s. While the size of the supercomputer market was growing, however, there were substantial uncertainties as to what type of architecture would dominate by the end of the decade. NEC managers had conceptualized that future performance improvements might come from either traditional ("vector") or parallel supercomputer architectures (see **Exhibits 7** and 8).

(1) *Traditional (Vector) supercomputer architecture.* In order to increase the total performance of the computer, this approach focused on increasing the processor's performance, building on the existing SX-3 computer design, through the introduction of more sophisticated bipolar integrated circuits and packaging modules. This path appeared limited by fundamental physical considerations, however (essentially by the fact that information can only travel as fast as the speed of light). It was hard to know precisely, but it was expected that this approach would not produce computers much more than 50 or 100 times faster than the SX-3.

(2) *Parallel computer architecture.* This approach focused on using as many processors in parallel as possible, and entailed no apparent performance limitations. The approach was new for NEC and involved the development of capabilities in three areas: software development, packaging systems, and integrated circuits. By 1991, substantial capabilities had already been built in software development and integrated circuit design for parallel computers. The computer engineering division and the fundamental research laboratories had performed several exploratory software development projects. Moreover, several efforts were underway to explore suitable integrated circuit concepts. The most promising alternatives entailed the application of relatively simple CMOS microprocessors, which would also be employed in workstations. High performance would be achieved simply by having a very large number of them (100 to 100,000) working in parallel.

In 1991, no current manufacturers of mainframes or vector supercomputers had a significant share of the parallel computer market. The current market leaders were Intel Corporation's System Group, Thinking Machines Inc., and Ncube.

New Challenges

NEC marketing managers expected that parallel computers would rapidly increase in sales after 1995, and that their market share would surmount that of traditional supercomputers by the year 2000 (see **Exhibit 9**). In 1991, however, the packaging group had only developed products employing the traditional vector computer architecture. Watari and Computer Engineering Division management felt that the packaging organization needed to anticipate future trends and begin to explore what packaging concepts would be needed for supercomputer design. Watari felt that NEC would probably

attempt to introduce a parallel computer by the mid 1990s, although no firm decision had yet been made.

There were other demands on Watari's packaging engineering organization, however. A new version of the SX-3 computer (the "SX-3R") was to be introduced in 1993, and a new mainframe was currently in the planning stages. These projects could easily keep the packaging engineering group busy by themselves. The current number of bipolar packaging engineers was still only 36. The CMOS packaging group was about the same size and quite busy developing packaging components for future minicomputers, personal computers and workstations.

Watari was uncertain as to the level of resources to devote to the development of parallel computer packaging concepts, and wondered what sequence of future projects would best serve NEC's current and future demands.

Exhibit 1 Sequence of Supercomputer and Mainframe Packaging Projects at NEC

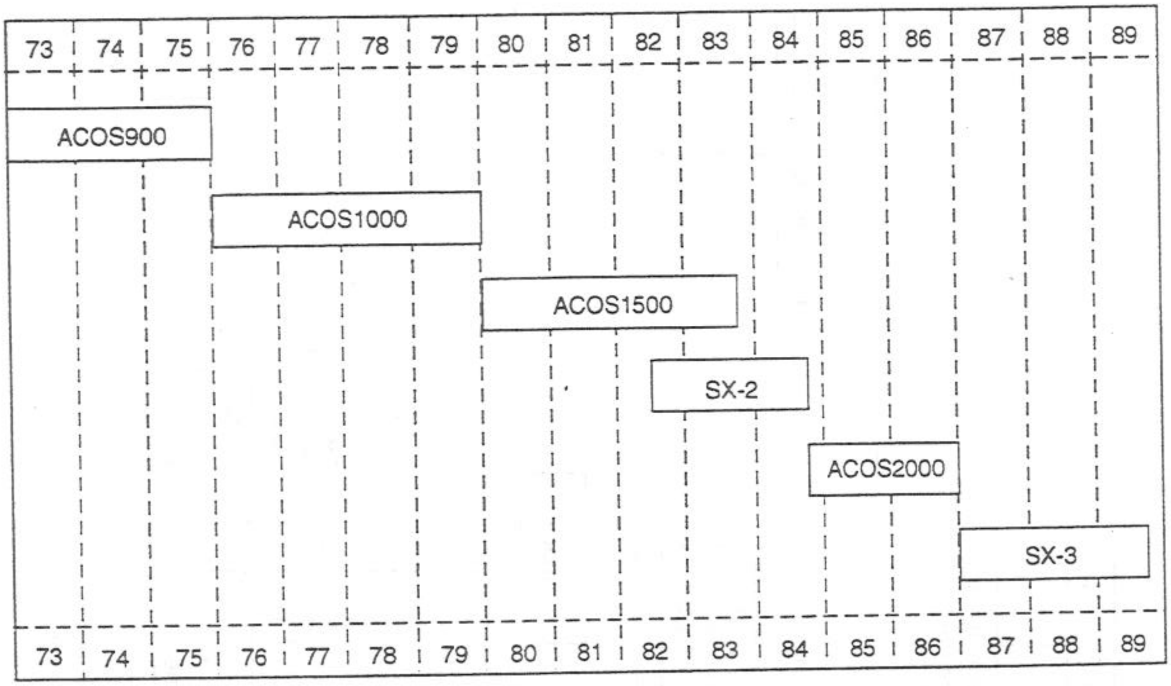


Exhibit 2 NEC's Organizational Structure

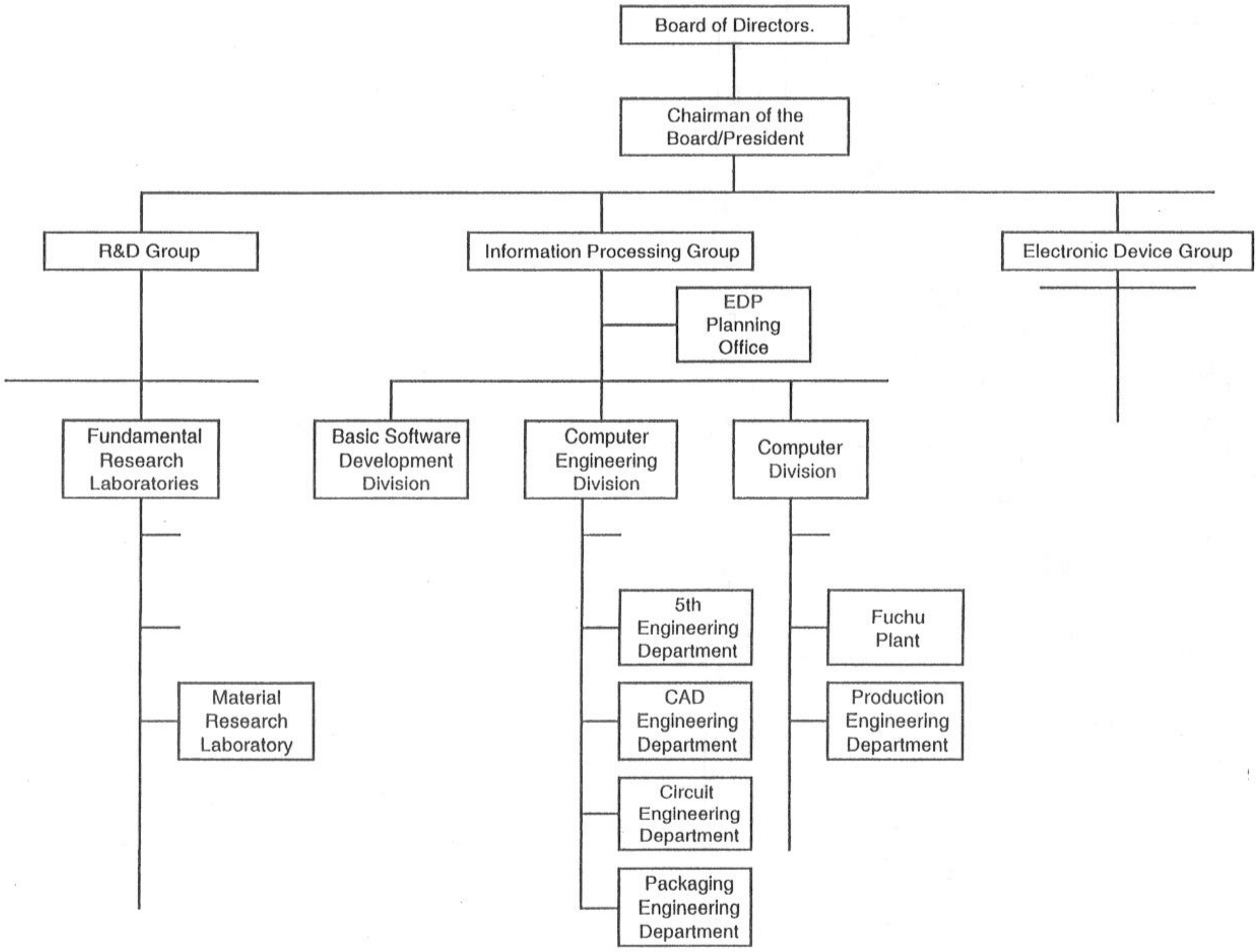


Exhibit 3 Evolution of the Mainframe and Supercomputer Markets in the 1980s

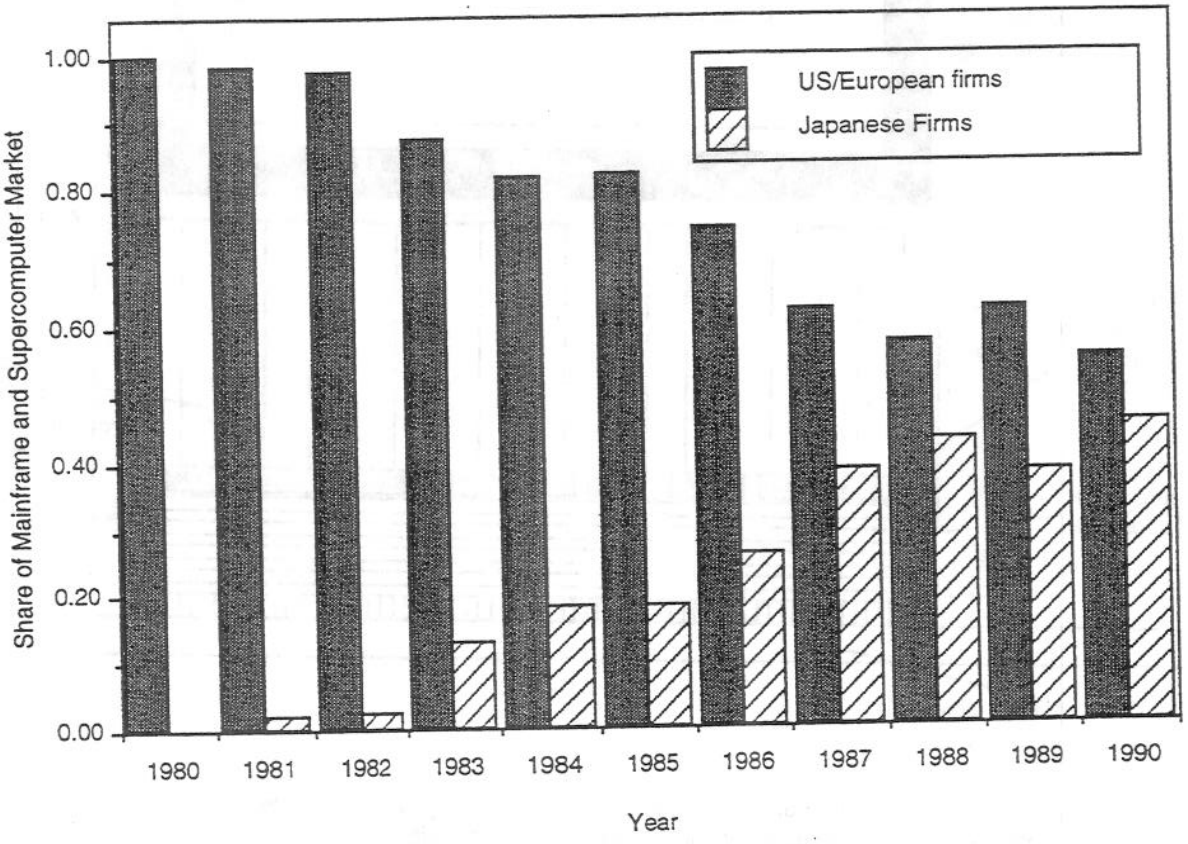
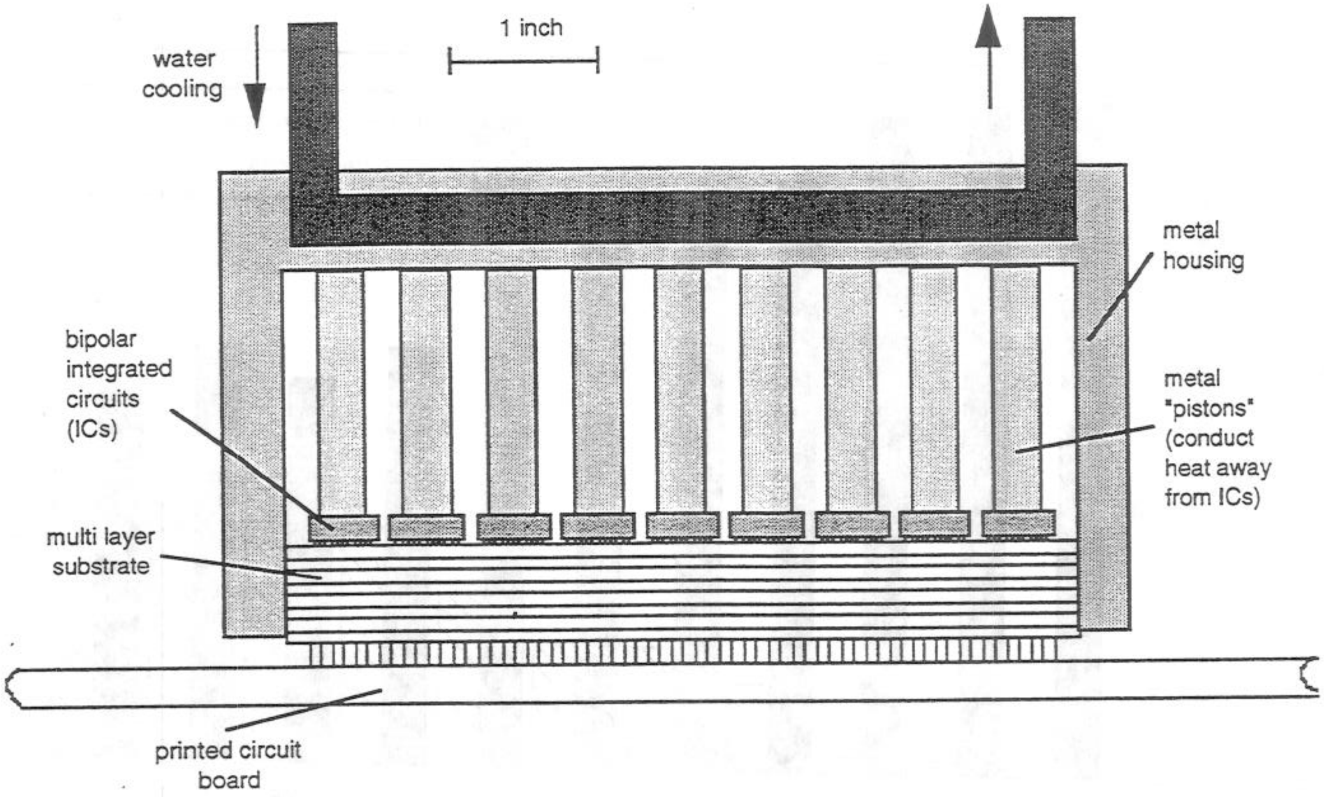
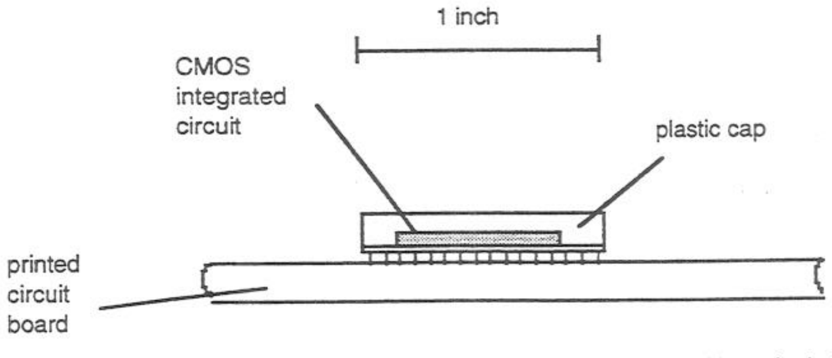


Exhibit 4 Sketches of a Mainframe and of a Personal Computer Processor



Typical mainframe processor module. A single processor is usually made up of several multi-chip modules like the one in the sketch. Each module contains many integrated circuits. The processor is cooled by water.



Typical personal computer processor. The entire processor is contained in a single integrated circuit, the "microprocessor." The processor is cooled by air.

Exhibit 5 Sketch of the SX-2 Processor Module Concept (Approach 1)
(Only a fraction of the module is shown)

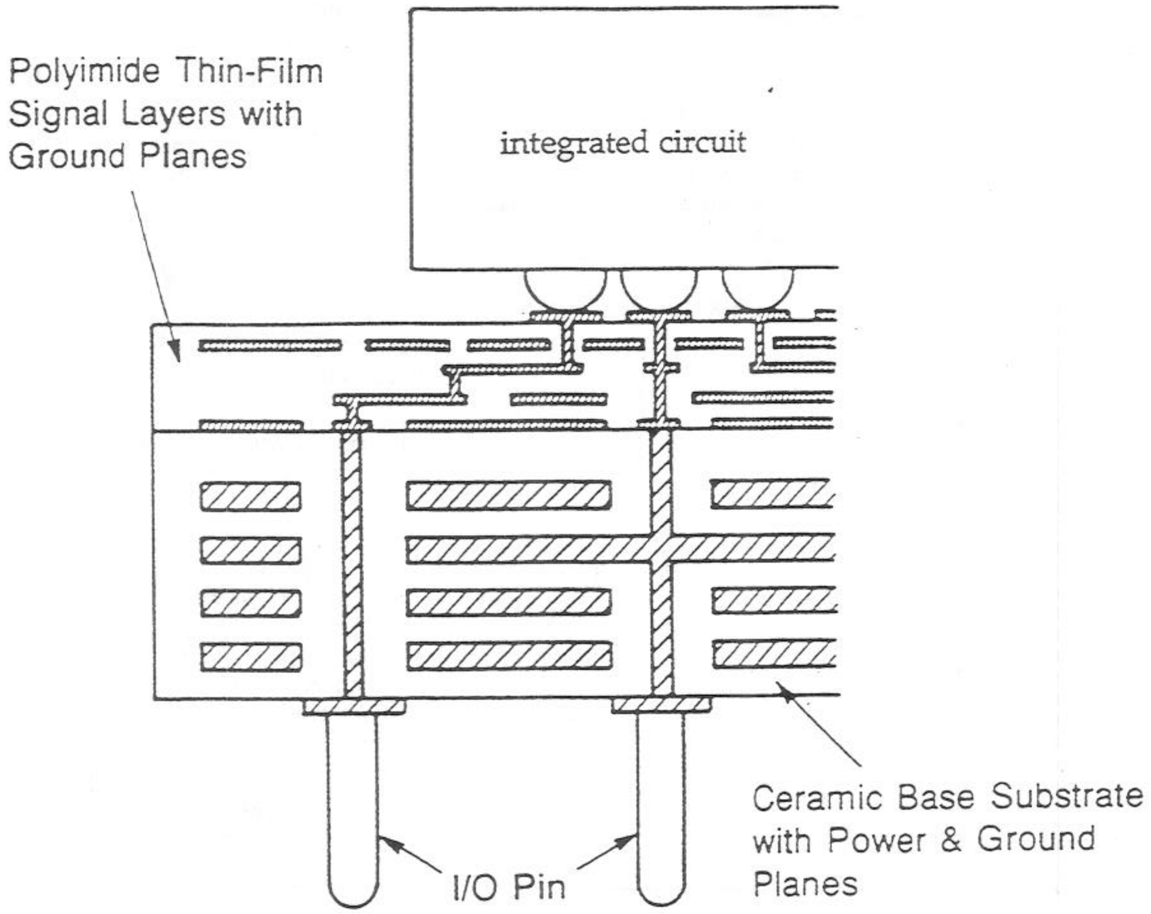


Exhibit 6 Timeline of the SX-2 Project

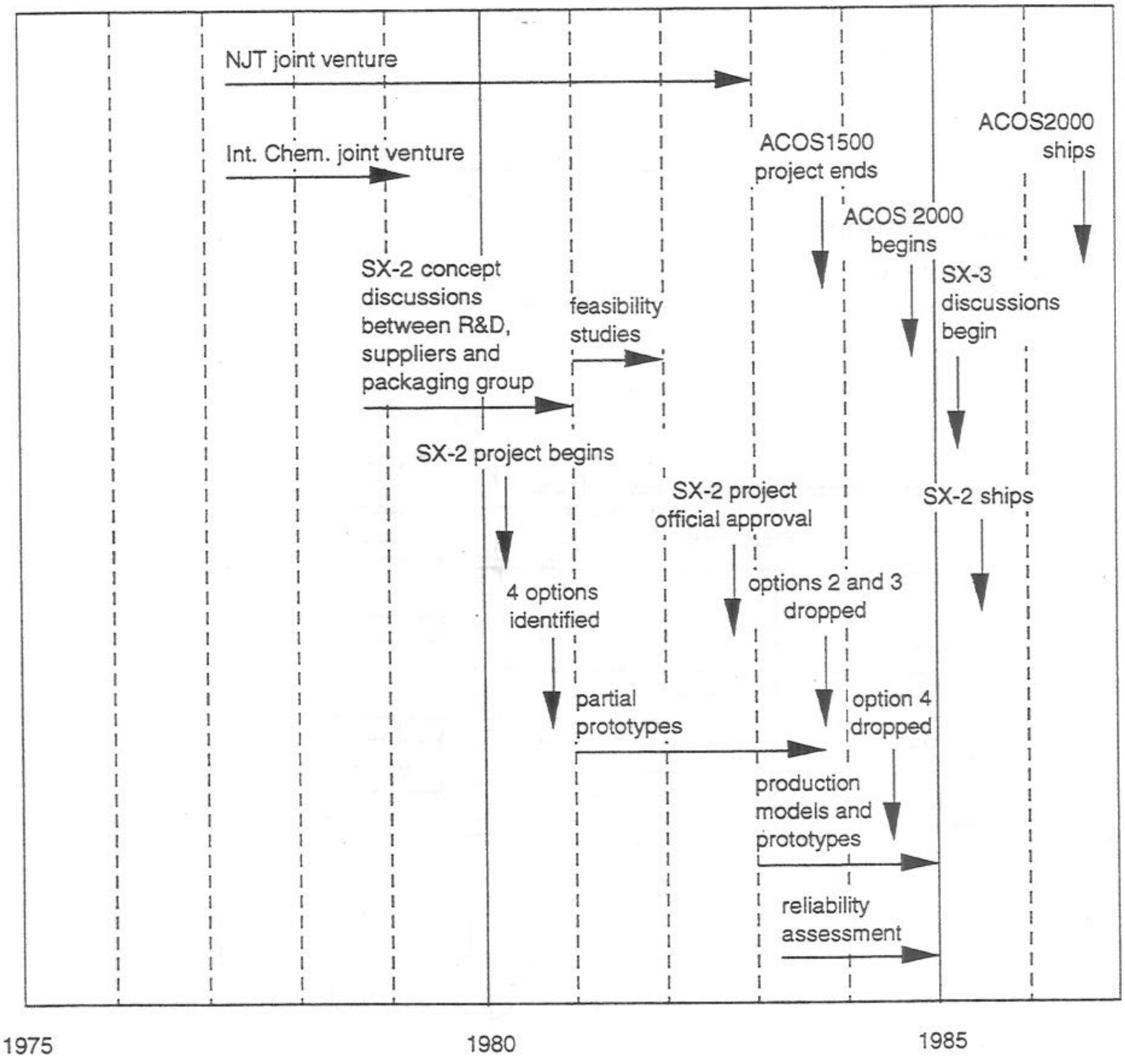
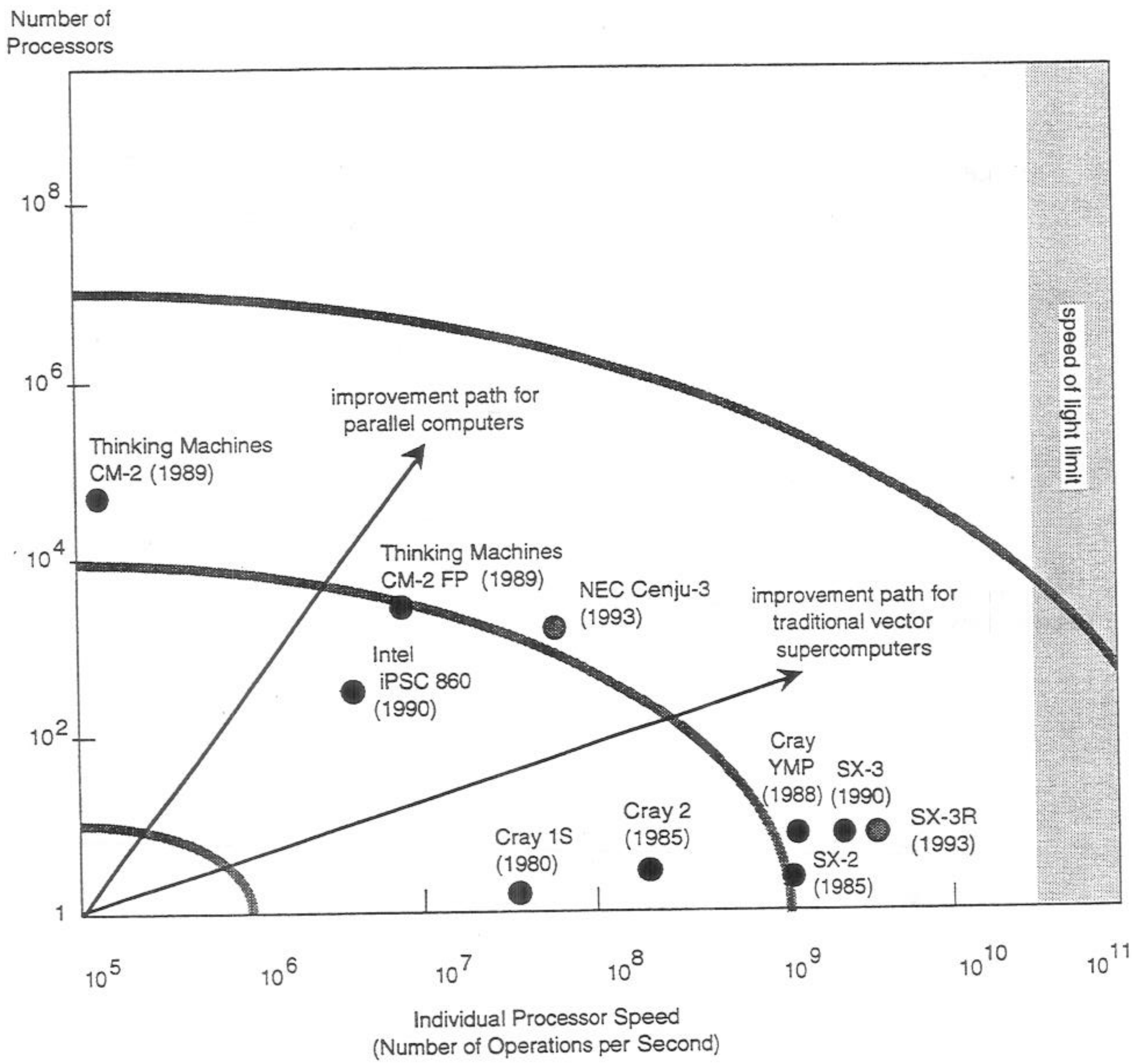


Exhibit 7 Technical Performance in Supercomputers



Total computer speed = Number of Processors x Individual Processor Speed

Lines (▬▬▬) indicate constant total computer speed

Exhibit 8 A Projection of the Evolution of Semiconductor Device Characteristics

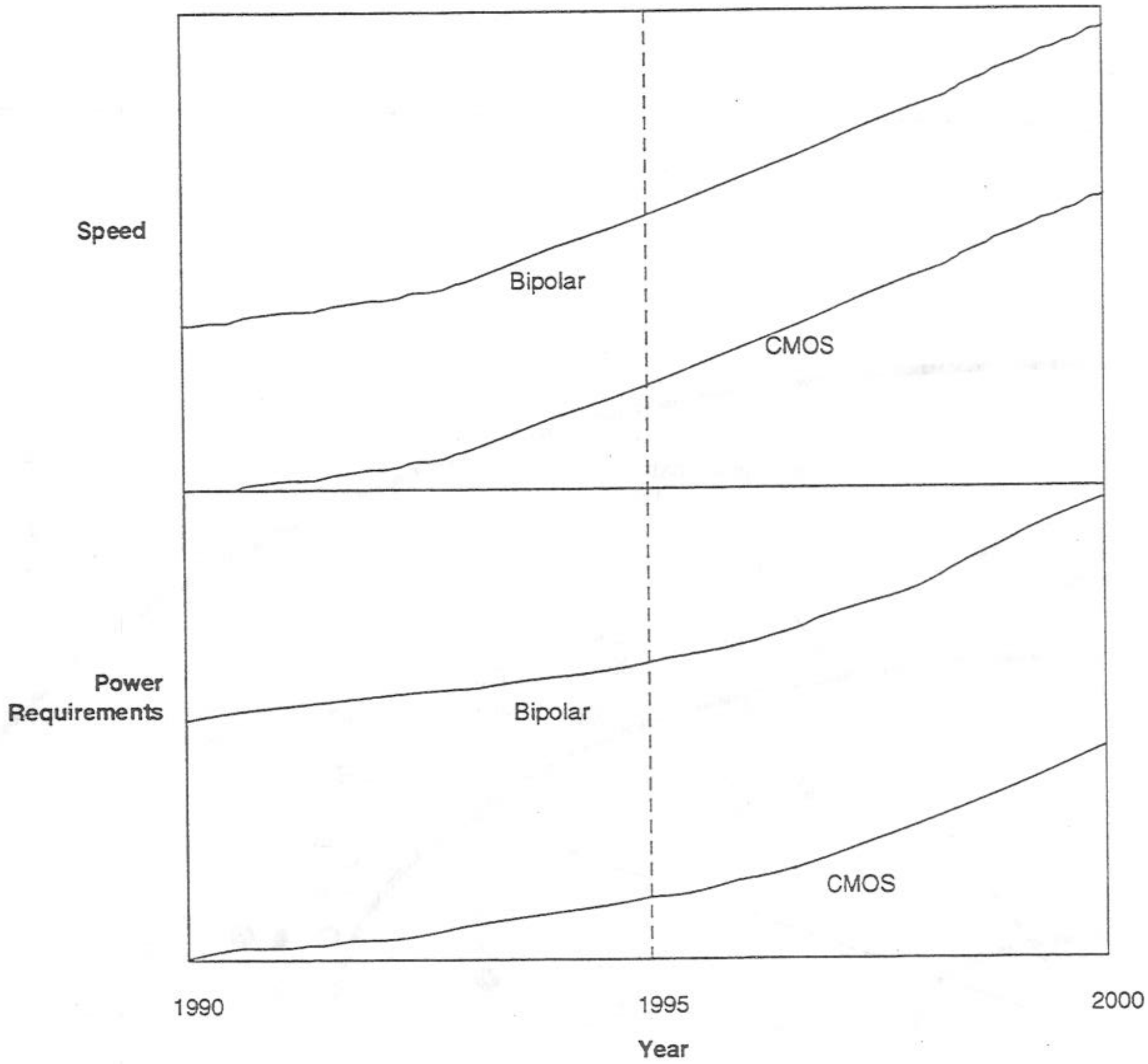
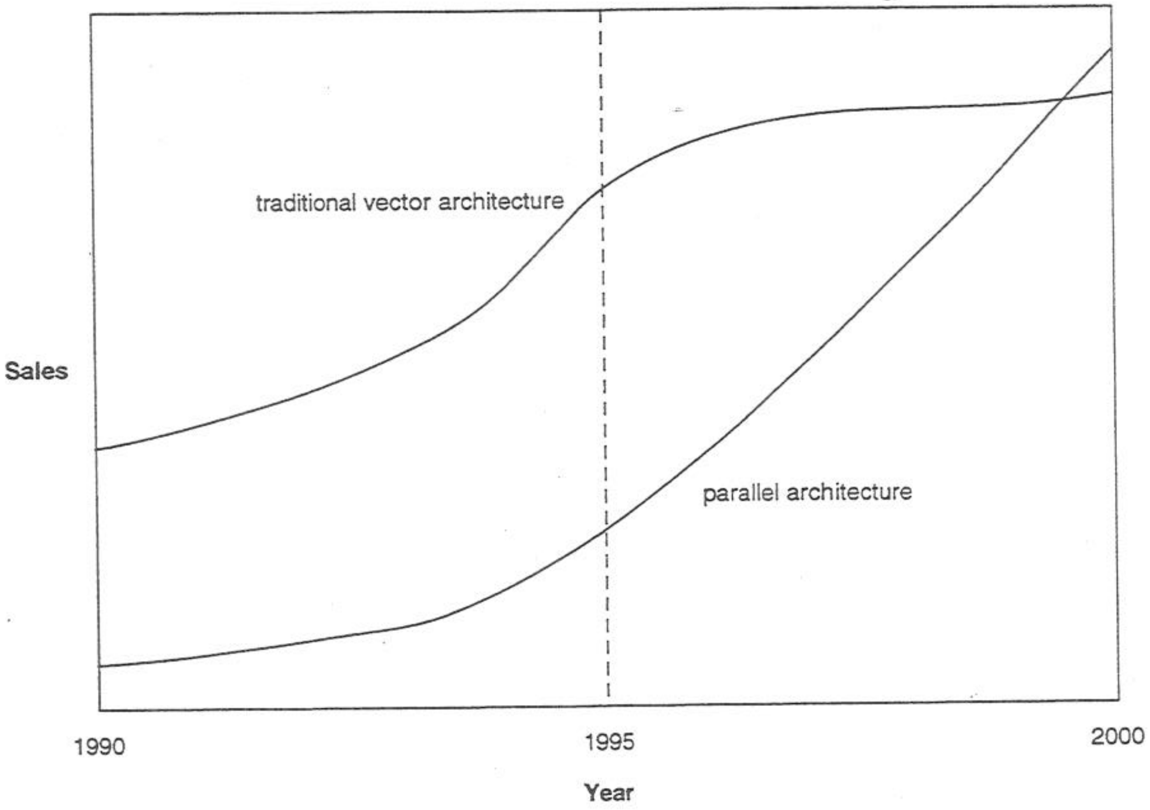


Exhibit 9 Expected Evolution of Supercomputer Market



15
WHARTON REPROGRAPHICS

From competitive advantage to corporate strategy

Michael E. Porter

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From competitive advantage to corporate strategy

Michael E. Porter

Corporate strategy, the overall plan for a diversified company, is both the darling and the stepchild of contemporary management practice – the darling because CEOs have been obsessed with diversification since the early 1960s, the stepchild because almost no consensus exists about what corporate strategy is, much less about how a company should formulate it.

The track record of corporate strategies has been dismal.

A diversified company has two levels of strategy: business unit (or competitive) strategy and corporate (or companywide) strategy. Competitive strategy concerns how to create competitive advantage in each of the businesses in which a company competes. Corporate strategy concerns two different questions: what businesses the corporation should be in and how the corporate office should manage the array of business units.

Corporate strategy is what makes the corporate whole add up to more than the sum of its business unit parts.

The track record of corporate strategies has been dismal. I studied the diversification records of 33 large, prestigious U.S. companies over the 1950-1986 period and found that most of them had divested many more acquisitions than they had kept. The corporate strategies of most companies have dissipated instead of created shareholder value.

The need to rethink corporate strategy could hardly be more urgent. By taking over companies and breaking them up, corporate raiders thrive on failed corporate strategy. Fueled by junk bond financing and growing acceptability, raiders can expose any company to takeover, no matter how large or blue chip.

Recognizing past diversification mistakes, some companies have initiated large-scale restructuring programs. Others have done nothing at all. Whatever the response, the strategic questions persist. Those who have restructured must decide what to do next to avoid repeating the past; those who have done nothing must awake to their vulnerability. To survive, companies must understand what good corporate strategy is.

A sober picture

While there is disquiet about the success of corporate strategies, none of the available evidence satisfactorily indicates the success or failure of corporate strategy. Most studies have approached the question by measuring the stock market valuation of

Michael E. Porter is professor of business administration at the Harvard Business School and author of Competitive Advantage *(Free Press, 1985) and* Competitive Strategy *(Free Press, 1980).*

Exhibit I **Diversification profiles of 33 leading U.S. companies**

Company	Number total entries	All entries into new industries	Percent acqui-sitions	Percent joint ventures	Percent start-ups
ALCO Standard	221	165	99 %	0 %	1 %
Allied Corp.	77	49	67	10	22
Beatrice	382	204	97	1	2
Borden	170	96	77	4	19
CBS	148	81	67	16	17
Continental Group	75	47	77	6	17
Cummins Engine	30	24	54	17	29
Du Pont	80	39	33	16	51
Exxon	79	56	34	5	61
General Electric	160	108	47	20	33
General Foods	92	53	91	4	6
General Mills	110	102	84	7	9
W.R.Grace	275	202	83	7	10
Gulf & Western	178	140	91	4	6
IBM	46	38	18	18	63
IC Industries	67	41	85	3	12
ITT	246	178	89	2	9
Johnson & Johnson	88	77	77	0	23
Mobil	41	32	53	16	31
Procter & Gamble	28	23	61	0	39
Raytheon	70	58	86	9	5
RCA	53	46	35	15	50
Rockwell	101	75	73	24	3
Sara Lee	197	141	96	1	4
Scovill	52	36	97	0	3
Signal	53	45	67	4	29
Tenneco	85	62	81	6	13
3M	144	125	54	2	45
TRW	119	82	77	10	13
United Technologies	62	49	57	18	24
Westinghouse	129	73	63	11	26
Wickes	71	47	83	0	17
Xerox	59	50	66	6	28
Total	**3,788**	**2,644**			
Average	**114.8**	**80.1**	**70.3 %**	**7.9 %**	**21.8 %**

Note:
Beatrice, Continental Group, General Foods, RCA, Scovill, and Signal were taken over as the study was being completed. Their data cover the period up through takeover but not subsequent divestments.

Entries into new industries that represented entirely new fields	Percent acquisitions	Percent joint ventures	Percent start-ups
56	100 %	0 %	0 %
17	65	6	29
61	97	0	3
32	75	3	22
28	65	21	14
19	79	11	11
13	46	23	31
19	37	0	63
17	29	6	65
29	48	14	38
22	86	5	9
27	74	7	19
66	74	5	21
48	88	2	10
16	19	0	81
17	88	6	6
50	92	0	8
18	56	0	44
15	60	7	33
14	79	0	21
16	81	19	6
19	37	21	42
27	74	22	4
41	95	2	2
12	92	0	8
20	75	0	25
26	73	8	19
34	71	3	56
28	64	11	25
17	23	17	39
36	61	3	36
22	68	0	32
18	50	11	39
906			
27.4	67.9 %	7.0 %	25.9 %

mergers, captured in the movement of the stock prices of acquiring companies immediately before and after mergers are announced.

These studies show that the market values mergers as neutral or slightly negative, hardly cause for serious concern.[1] Yet the short-term market reaction is a highly imperfect measure of the long-term success of diversification, and no self-respecting executive would judge a corporate strategy this way.

Studying the diversification programs of a company over a long period of time is a much more telling way to determine whether a corporate strategy has succeeded or failed. My study of 33 companies, many of which have reputations for good management, is a unique look at the track record of major corporations. (For an explanation of the research, see the insert "Where the Data Come From.") Each company entered an average of 80 new industries and 27 new fields. Just over 70% of the new entries were acquisitions 22% were start-ups, and 8% were joint ventures. IBM, Exxon, Du Pont, and 3M, for example, focused on start-ups, while ALCO Standard, Beatrice, and Sara Lee diversified almost solely through acquisitions (*Exhibit I* has a complete rundown).

My data paint a sobering picture of the success ratio of these moves (see *Exhibit II*). I found that on average corporations divested more than half their acquisitions in new industries and more than 60% of their acquisitions in entirely new fields. Fourteen companies left more than 70% of all the acquisitions they had made in new fields. The track record in unrelated acquisitions is even worse – the average divestment rate is a startling 74% (see *Exhibit III*). Even a highly respected company like General Electric divested a very high percentage of its acquisitions, particularly those in new fields. Companies near the top of the list in *Exhibit II* achieved a remarkably low rate of divestment. Some bear witness to the success of well-thought-out corporate strategies. Others, however, enjoy a lower rate simply because they have not faced up to their problem units and divested them.

I calculated total shareholder returns (stock price appreciation plus dividends) over the period of the study for each company so that I could compare them with its divestment rate. While companies near the top of the list have above-average shareholder returns, returns are not a reliable measure of diversification success. Shareholder return often depends heavily on the inherent attractiveness of companies' base industries. Companies like CBS and General Mills had extremely profitable base businesses that subsidized poor diversification track records.

I would like to make one comment on the use of shareholder value to judge performance. Linking shareholder value quantitatively to diversification performance only works if you compare the

shareholder value that is with the shareholder value that might have been without diversification. Because such a comparison is virtually impossible to make, my own measure of diversification success – the number of units retained by the company – seems to be as good an indicator as any of the contribution of diversification to corporate performance.

My data give a stark indication of the failure of corporate strategies.[2] Of the 33 companies, 6 had been taken over as my study was being completed (see the note on *Exhibit II*). Only the lawyers, investment bankers, and original sellers have prospered in most of these acquisitions, not the shareholders.

Premises of corporate strategy

Any successful corporate strategy builds on a number of premises. These are facts of life about diversification. They cannot be altered, and when ignored, they explain in part why so many corporate strategies fail.

Competition occurs at the business unit level. Diversified companies do not compete; only their business units do. Unless a corporate strategy places primary attention on nurturing the success of each unit, the strategy will fail, no matter how elegantly constructed. Successful corporate strategy must grow out of and reinforce competitive strategy.

Diversification inevitably adds costs and constraints to business units. Obvious costs such as the corporate overhead allocated to a unit may not be as important or subtle as the hidden costs and constraints. A business unit must explain its decisions to top management, spend time complying with planning and other corporate systems, live with parent company guidelines and personnel policies, and forgo the opportunity to motivate employees with direct equity ownership. These costs and constraints can be reduced but not entirely eliminated.

Shareholders can readily diversify themselves. Shareholders can diversify their own portfolios of stocks by selecting those that best match their preferences and risk profiles.[3] Shareholders can often diversify more cheaply than a corporation because they can buy shares at the market price and avoid hefty acquisition premiums.

These premises mean that corporate strategy cannot succeed unless it truly adds value – to business units by providing tangible benefits that offset the inherent costs of lost independence and to shareholders by diversifying in a way they could not replicate.

Passing the essential tests

To understand how to formulate corporate strategy, it is necessary to specify the conditions under which diversification will truly create shareholder value. These conditions can be summarized in three essential tests:

1 **The attractiveness test.** The industries chosen for diversification must be structurally attractive or capable of being made attractive.

2 **The cost-of-entry test.** The cost of entry must not capitalize all the future profits.

3 **The better-off test.** Either the new unit must gain competitive advantage from its link with the corporation or vice versa.

Of course, most companies will make certain that their proposed strategies pass some of these tests. But my study clearly shows that when companies ignored one or two of them, the strategic results were disastrous.

How attractive is the industry?

In the long run, the rate of return available from competing in an industry is a function of its underlying structure, which I have described in another HBR article.[4] An attractive industry with a high average return on investment will be difficult to enter because entry barriers are high, suppliers and buyers have only modest bargaining power, substitute products or services are few, and the rivalry among competitors is stable. An unattractive industry like steel will have structural flaws, including a plethora of substitute materials, powerful and price-sensitive buyers, and excessive rivalry caused by high fixed costs and a large group of competitors, many of whom are state supported.

Diversification cannot create shareholder value unless new industries have favorable structures that support returns exceeding the cost of capital. If the industry doesn't have such returns, the company must be able to restructure the industry or gain a sustainable competitive advantage that leads to returns well above the industry average. An industry need not be attractive before diversification. In fact, a

Where the data come from

We studied the 1950-1986 diversification histories of 33 large diversified U.S. companies. They were chosen at random from many broad sectors of the economy.

To eliminate distortions caused by World War II, we chose 1950 as the base year and then identified each business the company was in. We tracked every acquisition, joint venture, and start-up made over this period – 3,788 in all. We classified each as an entry into an entirely new sector or field (financial services, for example), a new industry within a field the company was already in (insurance, for example), or a geographic extension of an existing product or service. We also classified each new field as related or unrelated to existing units. Then we tracked whether and when each entry was divested or shut down and the number of years each remained part of the corporation.

Our sources included annual reports, 10K forms, the F&S Index, and Moody's, supplemented by our judgment and general knowledge of the industries involved. In a few cases, we asked the companies specific questions.

It is difficult to determine the success of an entry without knowing the full purchase or start-up price, the profit history, the amount and timing of ongoing investments made in the unit, whether any write-offs or write-downs were taken, and the selling price and terms of sale. Instead, we employed a relatively simple way to gauge success: *whether the entry was divested or shut down*. The underlying assumption is that a company will generally not divest or close down a successful business except in a comparatively few special cases. Companies divested many of the entries in our sample within five years, a reflection of disappointment with performance. Of the comparatively few divestments where the company disclosed a loss or a gain, the divestment resulted in a reported loss in more than half the cases.

The data in *Exhibit I* cover the entire 1950-1986 period. However, the divestment ratios in *Exhibit II* and *Exhibit III* do not compare entries and divestments over the entire period because doing so would overstate the success of diversification. Companies usually do not shut down or divest new entries immediately but hold them for some time to give them an opportunity to succeed. Our data show that the average holding period is five to slightly more than ten years, though many divestments occur within five years. To accurately gauge the success of diversification, we calculated the percentage of entries made by 1975 and by 1980 that were divested or closed down as of January 1987. If we had included more recent entries, we would have biased upward our assessment of how successful these entries had been.

As compiled, these data probably understate the rate of failure. Companies tend to announce acquisitions and other forms of new entry with a flourish but divestments and shutdowns with a whimper, if at all. We have done our best to root out every such transaction, but we have undoubtedly missed some. There may also be new entries that we did not uncover, but our best impression is that the number is not large.

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company might benefit from entering before the industry shows its full potential. The diversification can then transform the industry's structure.

In my research, I often found companies had suspended the attractiveness test because they had a vague belief that the industry "fit" very closely with their own businesses. In the hope that the corporate "comfort" they felt would lead to a happy outcome, the companies ignored fundamentally poor industry structures. Unless the close fit allows substantial competitive advantage, however, such comfort will turn into pain when diversification results in poor returns. Royal Dutch Shell and other leading oil companies have had this unhappy experience in a number of chemicals businesses, where poor industry structures overcame the benefits of vertical integration and skills in process technology.

Another common reason for ignoring the attractiveness test is a low entry cost. Sometimes the buyer has an inside track or the owner is anxious to sell. Even if the price is actually low, however, a one-shot gain will not offset a perpetually poor business. Almost always, the company finds it must reinvest in the newly acquired unit, if only to replace fixed assets and fund working capital.

Diversifying companies are also prone to use rapid growth or other simple indicators as a proxy for a target industry's attractiveness. Many that rushed into fast-growing industries (personal computers, video games, and robotics, for example) were burned because they mistook early growth for long-term profit potential. Industries are profitable not because they are sexy or high tech; they are profitable only if their structures are attractive.

What is the cost of entry?

Diversification cannot build shareholder value if the cost of entry into a new business eats up its expected returns. Strong market forces,

Exhibit II

Acquisition track records of leading U.S. diversifiers ranked by percent divested

Company	All acquisitions in new indu tries	Percent made by 1980 and then divested	Percent made by 1975 and then divested	Acquisitions in new industries that represented entirely new fields	Percent made by 1980 and then divested	Percent made by 1975 and then divested
Johnson & Johnson	59	17 %	12 %	10	33 %	14 %
Procter & Gamble	14	17	17	11	17	17
Raytheon	50	17	26	13	25	33
United Technologies	28	25	13	10	17	0
3M	67	26	27	24	42	45
TRW	63	27	31	18	40	38
IBM	7	33	0*	3	33	0*
Du Pont	13	38	43	7	60	75
Mobil	17	38	57	9	50	50
Borden	74	39	40	24	45	50
IC Industries	35	42	50	15	46	44
Tenneco	50	43	47	19	27	33
Beatrice	198	46	45	59	52	51
ITT	159	52	52	46	61	61
Rockwell	55	56	57	20	71	71
Allied Corp.	33	57	45	11	40	80
Exxon	19	62	20*	5	80	50*
Sara Lee	135	62	65	39	80	76
General Foods	48	63	62	19	93	93
Scovill	35	64	77	11	64	70
Signal	30	65	63	15	70	67
ALCO Standard	164	65	70	56	72	76
W.R. Grace	167	65	70	49	71	70
General Electric	51	65	78	14	100	100
Wickes	38	67	72	15	73	70
Westinghouse	46	68	69	22	61	59
Xerox	33	71	79	9	100	100
Continental Group	36	71	72	15	60	60
General Mills	86	75	73	20	65	60
Gulf & Western	127	79	78	42	75	72
Cummins Engine	13	80	80	6	83	83
RCA	16	80	92	7	86	100
CBS	54	87	89	18	88	88
Total	2,021			661		
Average per company†	61.2	53.4 %	56.5 %	20.0	60.0 %	61.5 %

*Companies with three or fewer acquisitions by the cutoff year.

†Companies with three or fewer acquisitions by the cutoff year are excluded from the average to minimize statistical distortions.

Note:
Beatrice, Continental Group, General Foods, RCA, Scovill, and Signal were taken over as the study was being completed. Their data cover the period up through takeover but not subsequent divestments.

however, are working to do just that. A company can enter new industries by acquisition or start-up. Acquisitions expose it to an increasingly efficient merger market. An acquirer beats the market if it pays a price not fully reflecting the prospects of the new unit. Yet multiple bidders are commonplace, information flows rapidly, and investmen bankers and other intermediaries work aggressively to make the market as efficient as possible. In recent years, new financial instruments such as junk bonds have brought new buyers into the market and made even large companies vulnerable to takeover. Acquisition premiums are high and reflect the acquired company's future prospects—sometimes too well. Philip Morris paid more than four times book value for Seven-Up Company, for example. Simple arithmetic meant that profits had to more than quadruple to sustain the preacquisition ROI. Since there proved to be little Philip Morris could add in marketing prowess to the sophisticated marketing wars in the soft-drink industry, the result was the unsatisfactory financial performance of Seven-Up and ultimately the decision to divest.

In a start-up, the company must overcome entry barriers. It's a real catch-22 situation, however, since attractive industries are attractive because their entry barriers are high. Bearing the full cost of the entry barriers might well dissipate any potential profits. Otherwise, other entrants to the industry would have already eroded its profitability.

In the excitement of finding an appealing new business, companies sometimes forget to apply the cost-of-entry test. The more attractive a new industry, the more expensive it is to get into.

Will the business be better off?

A corporation must bring some significant competitive advantage to the new unit, or the new unit must offer potential for significant advantage to the corporation. Sometimes, the benefits to the new unit accrue only once, near the time of entry, when the parent instigates a major overhaul of its strategy or installs a first-rate management team. Other diversification yields ongoing competitive advantage if the new unit can market its product, through the well-developed distribution system of its sister units, for instance. This is one of the important underpinnings of the merger of Baxter Travenol and American Hospital Supply.

When the benefit to the new unit comes only once, the parent company has no rationale for holding the new unit in its portfolio over the long term. Once the results of the one-time improvement are clear, the diversified company no longer adds value to offset the inevitable costs imposed on the unit. It is best to sell the unit and free up corporate resources.

The better-off test does not imply that diversifying corporate risk creates shareholder value in and of itself. Doing something for shareholders that they can do themselves is not a basis for corporate strategy. (Only in the case of a privately held company, in which the company's and the shareholder's risk are the same, is diversification to reduce risk valuable for its own sake.) Diversification of risk should only be a by-product of corporate strategy, not a prime motivator.

Executives ignore the better-off test most of all or deal with it through arm waving or trumped-up logic rather than hard strategic analysis. One reason is that they confuse company size with shareholder value. In the drive to run a bigger company, they lose sight of their real job. They may justify the suspension of the better-off test by pointing to the way they manage diversity. By cutting corporate staff to the bone and giving business units nearly complete autonomy, they believe they avoid the pitfalls. Such thinking misses the whole point of diversification, which is to create shareholder value rather than to avoid destroying it.

Concepts of corporate strategy

The three tests for successful diversification set the standards that any corporate strategy must meet; meeting them is so difficult that most diversification fails. Many companies lack a clear concept of corporate strategy to guide their diversification or pursue a concept that does not address the tests. Others fail because they implement a strategy poorly.

My study has helped me identify four concepts of corporate strategy that have been put into practice—portfolio management, restructuring, transferring skills, and sharing activities. While the concepts are not always mutually exclusive, each rests on a different mechanism by which the corporation creates shareholder value and each requires the diversified company to manage and organize itself in a different way. The first two require no connections among business units; the second two depend on them. (See *Exhibit IV*.) While all four concepts of strategy have succeeded under the right circumstances, today some make more sense than others. Ignoring any of the concepts is perhaps the quickest road to failure.

Portfolio management

The concept of corporate strategy most in use is portfolio management, which is based primar-

Exhibit III **Diversification performance in joint ventures, start-ups, and unrelated acquisitions**
Companies in same order as in Exhibit II

Company	Joint ventures as a percent of new entries	Percent made by 1980 and then divested	Percent made by 1975 and then divested	Start-ups as a percent of new entries	Percent made by 1980 and then divested
Johnson & Johnson	0%	†	†	23%	14%
Procter & Gamble	0	†	†	39	0
Raytheon	9	60%	60%	5	50
United Technologies	18	50	50	24	11
3M	2	100*	100*	45	2
TRW	10	20	25	13	63
IBM	18	100*	†	63	20
Du Pont	16	100*	†	51	61
Mobil	16	33	33	31	50
Borden	4	33	33	19	17
IC Industries	3	100*	100*	13	80
Tenneco	6	67	67	13	67
Beatrice	1	†	†	2	0
ITT	2	0*	†	8	38
Rockwell	24	38	42	3	0
Allied Corp.	10	100	75	22	38
Exxon	5	0	0	61	27
Sara Lee	1	†	†	4	75
General Foods	4	†	†	6	67
Scovill	0	†	†	3	100
Signal	4	†	†	29	20
ALCO Standard	0	†	†	1	†
W.R. Grace	7	33	38	10	71
General Electric	20	20	33	33	33
Wickes	0	†	†	17	63
Westinghouse	11	0*	0*	26	44
Xerox	6	100*	100*	28	50
Continental Group	6	67	67	17	14
General Mills	7	71	71	9	89
Gulf & Western	4	75	50	6	100
Cummins Engine	17	50	50	29	0
RCA	15	67	67	50	99
CBS	16	71	71	17	86
Average per company‡	7.9%	50.3%	48.9%	21.8%	44.0%

*Companies with two or fewer entries.

†No entries in this category.

‡Average excludes companies with two or fewer entries to minimize statistical distortions.

Note:
Beatrice, Continental Group, General Foods, RCA, Scovill, and Signal were taken over as the study was being completed. Their data cover the period up through takeover but not subsequent divestments.

Percent made by 1975 and then divested	Unrelated acquisitions as a percent of total acquisitions	Percent made by 1980 and then divested	Percent made by 1975 and then divested
20 %	0 %	†	†
0	9	†	†
50	46	40 %	40 %
20	40	0*	0*
3	33	75	86
71	39	71	71
22	33	100*	100*
61	43	0*	0*
56	67	60	100
13	21	80	80
30	33	50	50
80	42	33	40
0	63	59	53
57	61	67	64
0	35	100	100
29	45	50	0
19	100	80	50*
100*	41	73	73
50	42	86	83
100*	45	80	100
11	67	50	50
†	63	79	81
71	39	65	65
44	36	100	100
57	60	80	75
44	36	57	67
56	22	100	100
0	40	83	100
80	65	77	67
100	74	77	74
0	67	100	100
55	36	100	100
80	39	100	100
40.9 %	46.1 %	74.0 %	74.4 %

ily on diversification through acquisition. The corporation acquires sound, attractive companies with competent managers who agree to stay on. While acquired units do not have to be in the same industries as existing units, the best portfolio managers generally limit their range of businesses in some way, in part to limit the specific expertise needed by top management.

The acquired units are autonomous, and the teams that run them are compensated according to unit results. The corporation supplies capital and works with each to infuse it with professional management techniques. At the same time, top management provides objective and dispassionate review of business unit results. Portfolio managers categorize units by potential and regularly transfer resources from units that generate cash to those with high potential and cash needs.

In a portfolio strategy, the corporation seeks to create shareholder value in a number of ways. It uses its expertise and analytical resources to spot attractive acquisition candidates that the individual shareholder could not. The company provides capital on favorable terms that reflect corporatewide fund-raising ability. It introduces professional management skills and discipline. Finally, it provides high-quality review and coaching, unencumbered by conventional wisdom or emotional attachments to the business.

The logic of the portfolio management concept rests on a number of vital assumptions. If a company's diversification plan is to meet the attractiveness and cost-of-entry tests, it must find good but undervalued companies. Acquired companies must be truly undervalued because the parent does little for the new unit once it is acquired. To meet the better-off test, the benefits the corporation provides must yield a significant competitive advantage to acquired units. The style of operating through highly autonomous business units must both develop sound business strategies and motivate managers.

In most countries, the days when portfolio management was a valid concept of corporate strategy are past. In the face of increasingly well-developed capital markets, attractive companies with good managements show up on everyone's computer screen and attract top dollar in terms of acquisition premium. Simply contributing capital isn't contributing much. A sound strategy can easily be funded; small to medium-size companies don't need a munificent parent.

Other benefits have also eroded. Large companies no longer corner the market for professional management skills; in fact, more and more observers believe managers cannot necessarily run anything in the absence of industry-specific knowledge and experience. Another supposed advantage of the portfolio management concept – dispassionate review – rests on similarly shaky ground since the added value of review alone is questionable in a portfolio of sound companies.

The benefit of giving business units complete autonomy is also questionable. Increasingly, a company's business units are interrelated, drawn together by new technology, broadening distribution channels, and changing regulations. Setting strategies of units independently may well undermine unit performance. The companies in my sample that have succeeded in diversification have recognized the value of interrelationships and understood that a strong sense of corporate identity is as important as slavish adherence to parochial business unit financial results.

But it is the sheer complexity of the management task that has ultimately defeated even the best portfolio managers. As the size of the company grows, portfolio managers need to find more and more deals just to maintain growth. Supervising dozens or even hundreds of disparate units and under chain-letter pressures to add more, management begins to make mistakes. At the same time, the inevitable costs of being part of a diversified company take their toll and unit performance slides while the whole company's ROI turns downward. Eventually, a new management team is installed that initiates wholesale divestments and pares down the company to its core businesses. The experiences of Gulf & Western, Consolidated Foods (now Sara Lee), and ITT are just a few comparatively recent examples. Reflecting these realities, the U.S. capital markets today reward companies that follow the portfolio management model with a "conglomerate discount"; they value the whole less than the sum of the parts.

In developing countries, where large companies are few, capital markets are undeveloped, and professional management is scarce, portfolio management still works. But it is no longer a valid model for corporate strategy in advanced economies. Nevertheless, the technique is in the limelight today in the United Kingdom, where it is supported so far by a newly energized stock market eager for excitement. But this enthusiasm will wane – as well it should. Portfolio management is no way to conduct corporate strategy.

Restructuring

Unlike its passive role as a portfolio manager, when it serves as banker and reviewer, a company that bases its strategy on restructuring becomes an active restructurer of business units. The new businesses are not necessarily related to existing units. All that is necessary is unrealized potential.

The restructuring strategy seeks out undeveloped, sick, or threatened organizations or industries on the threshold of significant change. The parent intervenes, frequently changing the unit management team, shifting strategy, or infusing the company with new technology. Then it may make follow-up acquisitions to build a critical mass and sell off unneeded or unconnected parts and thereby reduce the effective acquisition cost. The result is a strengthened company or a transformed industry. As a coda, the parent sells off the stronger unit once results are clear because the parent is no longer adding value and top management decides that its attention should be directed elsewhere. (See the insert "An Uncanny British Restructurer" for an example of restructuring.)

A strong sense of corporate identity is as important as slavish adherence to business unit financial results.

When well implemented, the restructuring concept is sound, for it passes the three tests of successful diversification. The restructurer meets the cost-of-entry test through the types of company it acquires. It limits acquisition premiums by buying companies with problems and lackluster images or by buying into industries with as yet unforeseen potential. Intervention by the corporation clearly meets the better-off test. Provided that the target industries are structurally attractive, the restructuring model can create enormous shareholder value. Some restructuring companies are Loew's, BTR, and General Cinema. Ironically, many of today's restructurers are profiting from yesterday's portfolio management strategies.

To work, the restructuring strategy requires a corporate management team with the insight to spot undervalued companies or positions in industries ripe for transformation. The same insight is necessary to actually turn the units around even though they are in new and unfamiliar businesses.

These requirements expose the restructurer to considerable risk and usually limit the time in which the company can succeed at the strategy. The most skillful proponents understand this problem, recognize their mistakes, and move decisively to dispose of them. The best companies realize they are not just acquiring companies but restructuring an industry. Unless they can integrate the acquisitions to create a whole new strategic position, they are just portfolio managers in disguise. Another important difficulty surfaces if so many other companies join the action that they deplete the pool of suitable candidates and bid their prices up.

Perhaps the greatest pitfall, however, is that companies find it very hard to dispose of business units once they are restructured and performing well.

Exhibit IV **Concepts of corporate strategy**

	Portfolio management	Restructuring	Transferring skills	Sharing activities
Strategic prerequisites	Superior insight into identifying and acquiring undervalued companies Willingness to sell off losers quickly or to opportunistically divest good performers when buyers are willing to pay large premiums Broad guidelines for and constraints on the types of units in the portfolio so that senior management can play the review role effectively A private company or undeveloped capital markets Ability to shift away from portfolio management as the capital markets get more efficient or the company gets unwieldy	Superior insight into identifying restructuring opportunities Willingness and capability to intervene to transform acquired units Broad similarities among the units in the portfolio Willingness to cut losses by selling off units where restructuring proves unfeasible Willingness to sell units when restructuring is complete, the results are clear, and market conditions are favorable	Proprietary skills in activities important to competitive advantage in target industries Ability to accomplish the transfer of skills among units on an ongoing basis Acquisitions of beachhead positions in new industries as a base	Activities in existing units that can be shared with new business units to gain competitive advantage Benefits of sharing that outweigh the costs Both start-ups and acquisitions as entry vehicles Ability to overcome organizational resistance to business unit collaboration
Organizational prerequisites	Autonomous business units A very small, low-cost, corporate staff Incentives based largely on business unit results	Autonomous business units A corporate organization with the talent and resources to oversee the turnarounds and strategic repositionings of acquired units Incentives based largely on acquired units' results	Largely autonomous but collaborative business units High-level corporate staff members who see their role primarily as integrators Cross-business-unit committees, task forces, and other forums to serve as focal points for capturing and transferring skills Objectives of line managers that include skills transfer Incentives based in part on corporate results	Strategic business units that are encouraged to share activities An active strategic planning role at group, sector, and corporate levels High-level corporate staff members who see their roles primarily as integrators Incentives based heavily on group and corporate results
Common pitfalls	Pursuing portfolio management in countries with efficient capital marketing and a developed pool of professional management talent Ignoring the fact that industry structure is not attractive	Mistaking rapid growth or a "hot" industry as sufficient evidence of a restructuring opportunity Lacking the resolve or resources to take on troubled situations and to intervene in management Ignoring the fact that industry structure is not attractive Paying lip service to restructuring but actually practicing passive portfolio management	Mistaking similarity or comfort with new businesses as sufficient basis for diversification Providing no practical ways for skills transfer to occur Ignoring the fact that industry structure is not attractive	Sharing for its own sake rather than because it leads to competitive advantage Assuming sharing will occur naturally without senior management playing an active role Ignoring the fact that industry structure is not attractive

Human nature fights economic rationale. Size supplants shareholder value as the corporate goal. The company does not sell a unit even though the company no longer adds value to the unit. While the transformed units would be better off in another company that had related businesses, the restructuring company instead retains them. Gradually, it becomes a portfolio manager. The parent company's ROI declines as the need for reinvestment in the units and normal business risks eventually offset restructuring's one-shot gain. The perceived need to keep growing intensifies the pace of acquisition; errors result and standards fall. The restructuring company turns into a conglomerate with returns that only equal the average of all industries at best.

Transferring skills

The purpose of the first two concepts of corporate strategy is to create value through a company's relationship with each autonomous unit. The corporation's role is to be a selector, a banker, and an intervenor.

The last two concepts exploit the interrelationships between businesses. In articulating them, however, one comes face-to-face with the often ill-defined concept of synergy. If you believe the text of the countless corporate annual reports, just about anything is related to just about anything else! But imagined synergy is much more common than real synergy. GM's purchase of Hughes Aircraft simply because cars were going electronic and Hughes was an electronics concern demonstrates the folly of paper synergy. Such corporate relatedness is an ex post facto rationalization of a diversification undertaken for other reasons.

Portfolio management is no way to conduct corporate strategy.

Even synergy that is clearly defined often fails to materialize. Instead of cooperating, business units often compete. A company that can define the synergies it is pursuing still faces significant organizational impediments in achieving them.

But the need to capture the benefits of relationships between businesses has never been more important. Technological and competitive developments already link many businesses and are creating new possibilities for competitive advantage. In such sectors as financial services, computing, office equipment, entertainment, and health care, interrelationships among previously distinct businesses are perhaps the central concern of strategy.

To understand the role of relatedness in corporate strategy, we must give new meaning to this often ill-defined idea. I have identified a good way to start – the value chain.[5] Every business unit is a collection of discrete activities ranging from sales to accounting that allow it to compete. I call them value activities. It is at this level, not in the company as a whole, that the unit achieves competitive advantage.

I group these activities in nine categories. *Primary* activities create the product or service, deliver and market it, and provide after-sale support. The categories of primary activities are inbound logistics, operations, outbound logistics, marketing and sales, and service. *Support* activities provide the input and infrastructure that allow the primary activities to take place. The categories are company infrastructure, human resource management, technology development, and procurement.

The value chain defines the two types of interrelationships that may create synergy. The first is a company's ability to transfer skills or expertise among similar value chains. The second is the ability to share activities. Two business units, for example, can share the same sales force or logistics network.

The value chain helps expose the last two (and most important) concepts of corporate strategy. The transfer of skills among business units in the diversified company is the basis for one concept. While each business unit has a separate value chain, knowledge about how to perform activities is transferred among the units. For example, a toiletries business unit, expert in the marketing of convenience products, transmits ideas on new positioning concepts, promotional techniques, and packaging possibilities to a newly acquired unit that sells cough syrup. Newly entered industries can benefit from the expertise of existing units and vice versa.

These opportunities arise when business units have similar buyers or channels, similar value activities like government relations or procurement, similarities in the broad configuration of the value chain (for example, managing a multisite service organization), or the same strategic concept (for example, low cost). Even though the units operate separately, such similarities allow the sharing of knowledge.

Of course, some similarities are common; one can imagine them at some level between almost any pair of businesses. Countless companies have fallen into the trap of diversifying too readily because of similarities; mere similarity is not enough.

Transferring skills leads to competitive advantage only if the similarities among businesses meet three conditions:

1 The activities involved in the businesses are similar enough that sharing expertise is meaningful. Broad similarities (marketing intensiveness, for example, or a common core process technology such as bending metal) are not a sufficient basis for diversification. The resulting ability to transfer skills is likely to have little impact on competitive advantage.

2 The transfer of skills involves activities important to competitive advantage. Transferring skills in peripheral activities such as government relations or real estate in consumer goods units may be beneficial but is not a basis for diversification.

3 The skills transferred represent a significant source of competitive advantage for the receiving unit. The expertise or skills to be transferred are both advanced and proprietary enough to be beyond the capabilities of competitors.

The transfer of skills is an active process that significantly changes the strategy or operations of the receiving unit. The prospect for change must be specific and identifiable. Almost guaranteeing that no shareholder value will be created, too many companies

An uncanny British restructurer

Hanson Trust, on its way to becoming Britain's largest company, is one of several skillful followers of the restructuring concept. A conglomerate with units in many industries, Hanson might seem on the surface a portfolio manager. In fact, Hanson and one or two other conglomerates have a much more effective corporate strategy. Hanson has acquired companies such as London Brick, Ever Ready Batteries, and SCM, which the city of London rather disdainfully calls "low tech."

Although a mature company suffering from low growth, the typical Hanson target is not just in any industry; it has an attractive structure. Its customer and supplier power is low and rivalry with competitors moderate. The target is a market leader, rich in assets but formerly poor in management. Hanson pays little of the present value of future cash flow out in an acquisition premium and reduces purchase price even further by aggressively selling off businesses that it cannot improve. In this way, it recoups just over a third of the cost of a typical acquisition during the first six months of ownership. Imperial Group's plush properties in London lasted barely two months under Hanson ownership, while Hanson's recent sale of Courage Breweries to Elders recouped £1.4 billion of the original £2.1 billion acquisition price of Imperial Group.

Like the best restructurers, Hanson approaches each unit with a modus operandi that it has perfected through repetition.

Hanson emphasizes low costs and tight financial controls. It has cut an average of 25% of labor costs out of acquired companies, slashed fixed overheads, and tightened capital expenditures. To reinforce its strategy of keeping costs low, Hanson carves out detailed one-year financial budgets with divisional managers and (through generous use of performance-related bonuses and share option schemes) gives them incentive to deliver the goods.

It's too early to tell whether Hanson will adhere to the last tenet of restructuring – selling turned-around units once the results are clear. If it succumbs to the allure of bigness, Hanson may take the course of the failed U.S. conglomerates.

are satisfied with vague prospects or faint hopes that skills will transfer. The transfer of skills does not happen by accident or by osmosis. The company will have to reassign critical personnel, even on a permanent basis, and the participation and support of high-level management in skills transfer is essential. Many companies have been defeated at skills transfer because they have not provided their business units with any incentives to participate.

Transferring skills meets the tests of diversification if the company truly mobilizes proprietary expertise across units. This makes certain the company can offset the acquisition premium or lower the cost of overcoming entry barriers.

The industries the company chooses for diversification must pass the attractiveness test. Even a close fit that reflects opportunities to transfer skills may not overcome poor industry structure. Opportunities to transfer skills, however, may help the company transform the structures of newly entered industries and send them in favorable directions.

The transfer of skills can be one-time or ongoing. If the company exhausts opportunities to infuse new expertise into a unit after the initial post-acquisition period, the unit should ultimately be sold. The corporation is no longer creating shareholder value. Few companies have grasped this point, however, and many gradually suffer mediocre returns. Yet a company diversified into well-chosen businesses can transfer skills eventually in many directions. If corporate management conceives of its role in this way and creates appropriate organizational mechanisms to facilitate cross-unit interchange, the opportunities to share expertise will be meaningful.

By using both acquisitions and internal development, companies can build a transfer-of-skills strategy. The presence of a strong base of skills sometimes creates the possibility for internal entry instead of the acquisition of a going concern. Successful diversifiers that employ the concept of skills transfer may, however, often acquire a company in the target industry as a beachhead and then build on it with their internal expertise. By doing so, they can reduce some of the risks of internal entry and speed up the process. Two companies that have diversified using the transfer-of-skills concept are 3M and Pepsico.

Sharing activities

The fourth concept of corporate strategy is based on sharing activities in the value chains among business units. Procter & Gamble, for example, employs a common physical distribution system and sales force in both paper towels and disposable diapers. McKesson, a leading distribution company, will handle such diverse lines as pharmaceuticals and liquor through superwarehouses.

The ability to share activities is a potent basis for corporate strategy because sharing often enhances competitive advantage by lowering cost or raising differentiation. But not all sharing leads to competitive advantage, and companies can encounter deep organizational resistance to even beneficial sharing possibilities. These hard truths have led many companies to reject synergy prematurely and retreat to the false simplicity of portfolio management.

A cost-benefit analysis of prospective sharing opportunities can determine whether synergy is possible. Sharing can lower costs if it achieves economies of scale, boosts the efficiency of utilization, or helps a company move more rapidly down the learning curve. The costs of General Electric's advertising, sales, and after-sales service activities in major appliances are low because they are spread over a wide range of appliance products. Sharing can also enhance the potential for differentiation. A shared order-processing system, for instance, may allow new features and services that a buyer will value. Sharing can also reduce the cost of differentiation. A shared service network, for example, may make more advanced, remote servicing technology economically feasible. Often, sharing will allow an activity to be wholly reconfigured in ways that can dramatically raise competitive advantage.

Sharing must involve activities that are significant to competitive advantage, not just any activity. P&G's distribution system is such an instance in the diaper and paper towel business, where products are bulky and costly to ship. Conversely, diversification based on the opportunities to share only corporate overhead is rarely, if ever, appropriate.

Sharing activities inevitably involves costs that the benefits must outweigh. One cost is the greater coordination required to manage a shared activity. More important is the need to compromise the design or performance of an activity so that it can be shared. A salesperson handling the products of two business units, for example, must operate in a way that is usually not what either unit would choose were it independent. And if compromise greatly erodes the unit's effectiveness, then sharing may reduce rather than enhance competitive advantage.

Many companies have only superficially identified their potential for sharing. Companies also merge activities without consideration of whether they are sensitive to economies of scale. When they are not, the coordination costs kill the benefits. Companies compound such errors by not identifying costs of sharing in advance, when steps can be taken to minimize them. Costs of compromise can frequently be mitigated by redesigning the activity for sharing. The shared salesperson, for example, can be provided with a remote computer terminal to boost productivity and provide more customer information. Jamming business units together without such thinking exacerbates the costs of sharing.

Despite such pitfalls, opportunities to gain advantage from sharing activities have proliferated because of momentous developments in technology, deregulation, and competition. The infusion of electronics and information systems into many industries creates new opportunities to link businesses. The corporate strategy of sharing can involve both acquisition and internal development. Internal development is often possible because the corporation can bring to bear clear resources in launching a new unit. Start-ups are less difficult to integrate than acquisitions. Companies using the shared-activities concept can also make acquisitions as beachhead landings into a new industry and then integrate the units through sharing with oth-

Adding value with hospitality

Marriott began in the restaurant business in Washington, D.C. Because its customers often ordered takeouts on the way to the national airport, Marriott eventually entered airline catering. From there, it jumped into food service management for institutions. Marriott then began broadening its base of family restaurants and entered the hotel industry. More recently, it has moved into restaurants, snack bars, and merchandise shops in airport terminals and into gourmet restaurants. In addition, Marriott has branched out from its hotel business into cruise ships, theme parks, wholesale travel agencies, budget motels, and retirement centers.

Marriott's diversification has exploited well-developed skills in food service and hospitality. Marriott's kitchens prepare food according to more than 6,000 standardized recipe cards; hotel procedures are also standardized and painstakingly documented in elaborate manuals. Marriott shares a number of important activities across units. A shared procurement and distribution system for food serves all Marriott units through nine regional procurement centers. As a result, Marriott earns 50% higher margins on food service than any other hotel company. Marriott also has a fully integrated real estate unit that brings corporatewide power to bear on site acquisitions as well as on the designing and building of all Marriott locations.

Marriott's diversification strategy balances acquisitions and start-ups. Start-ups or small acquisitions are used for initial entry, depending on how close the opportunities for sharing are. To expand its geographic base, Marriott acquires companies and then disposes of the parts that do not fit.

Apart from this success, it is important to note that Marriott has divested 36% of both its acquisitions and its start-ups. While this is an above-average record, Marriott's mistakes are quite illuminating. Marriott has largely failed in diversifying into gourmet restaurants, theme parks, cruise ships, and wholesale travel agencies. In the first three businesses, Marriott discovered it could not transfer skills despite apparent similarities. Standardized menus did not work well in gourmet restaurants. Running cruise ships and theme parks was based more on entertainment and pizzazz than the carefully disciplined management of hotels and mid-price restaurants. The wholesale travel agencies were ill fated from the start because Marriott had to compete with an important customer for its hotels and had no proprietary skills or opportunities to share with which to add value.

er units. Prime examples of companies that have diversified via using shared activities include P&G, Du Pont, and IBM. The fields into which each has diversified are a cluster of tightly related units. Marriott illustrates both successes and failures in sharing activities over time. (See the insert "Adding Value with Hospitality.")

Following the shared-activities model requires an organizational context in which business unit collaboration is encouraged and reinforced. Highly autonomous business units are inimical to such collaboration. The company must put into place a variety of what I call horizontal mechanisms—a strong sense of corporate identity, a clear corporate mission statement that emphasizes the importance of integrating business unit strategies, an incentive system that rewards more than just business unit results, cross-business-unit task forces, and other methods of integrating.

A corporate strategy based on shared activities clearly meets the better-off test because business units gain ongoing tangible advantages from others within the corporation. It also meets the cost-of-entry test by reducing the expense of surmounting the barriers to internal entry. Other bids for acquisitions that do not share opportunities will have lower reservation prices. Even widespread opportunities for sharing activities do not allow a company to suspend the attractiveness test, however. Many diversifiers have made the critical mistake of equating the close fit of a target industry with attractive diversification. Target industries must pass the strict requirement test of having an attractive structure as well as a close fit in opportunities if diversification is to ultimately succeed.

Choosing a corporate strategy

Each concept of corporate strategy allows the diversified company to create shareholder value in a different way. Companies can succeed with any of the concepts if they clearly define the corporation's role and objectives, have the skills necessary for meeting the concept's prerequisites, organize themselves to manage diversity in a way that fits the strategy, and find themselves in an appropriate capital market environment. The caveat is that portfolio management is only sensible in limited circumstances.

A company's choice of corporate strategy is partly a legacy of its past. If its business units are in unattractive industries, the company must start from scratch. If the company has few truly proprietary skills or activities it can share in related diversification, then its initial diversification must rely on other concepts. Yet corporate strategy should not be a once-and-for-all choice but a vision that can evolve. A company should choose its long-term preferred concept and then proceed pragmatically toward it from its initial starting point.

Both the strategic logic and the experience of the companies I studied over the last decade suggest that a company will create shareholder value through diversification to a greater and greater extent as its strategy moves from portfolio management toward sharing activities. Because they do not rely on superior insight or other questionable assumptions about the company's capabilities, sharing activities and transferring skills offer the best avenues for value creation.

Sharing allows activities to change completely in ways that increase competitive advantage.

Each concept of corporate strategy is not mutually exclusive of those that come before, a potent advantage of the third and fourth concepts. A company can employ a restructuring strategy at the same time it transfers skills or shares activities. A strategy based on shared activities becomes more powerful if business units can also exchange skills. As the Marriott case illustrates, a company can often pursue the two strategies together and even incorporate some of the principles of restructuring with them. When it chooses industries in which to transfer skills or share activities, the company can also investigate the possibility of transforming the industry structure. When a company bases its strategy on interrelationships, it has a broader basis on which to create shareholder value than if it rests its entire strategy on transforming companies in unfamiliar industries.

My study supports the soundness of basing a corporate strategy on the transfer of skills or shared activities. The data on the sample companies' diversification programs illustrate some important characteristics of successful diversifiers. They have made a disproportionately low percentage of unrelated acquisitions, *unrelated* being defined as having no clear opportunity to transfer skills or share important activities (see *Exhibit III*). Even successful diversifiers such as 3M, IBM, and TRW have terrible records when they have strayed into unrelated acquisitions. Successful acquirers diversify into fields, each of which is related to many others. Procter & Gamble and IBM, for example, operate in 18 and 19 interrelated fields respectively and so enjoy numerous opportunities to transfer skills and share activities.

Companies with the best acquisition records tend to make heavier-than-average use of start-ups and joint ventures. Most companies shy away from modes of entry besides acquisition. My results cast doubt on the conventional wisdom regarding start-ups. *Exhibit III* demonstrates that while joint ventures are about as risky as acquisitions, start-ups are not. Moreover, successful companies often have very good records with start-up units, as 3M, P&G, Johnson & Johnson, IBM, and United Technologies illustrate. When a company has the internal strength to start up a unit, it can be safer and less costly to launch a company than to rely solely on an acquisition and then have to deal with the problem of integration. Japanese diversification histories support the soundness of start-up as an entry alternative.

My data also illustrate that none of the concepts of corporate strategy works when industry structure is poor or implementation is bad, no matter how related the industries are. Xerox acquired companies in related industries, but the businesses had poor structures and its skills were insufficient to provide enough competitive advantage to offset implementation problems.

An action program

To translate the principles of corporate strategy into successful diversification, a company must first take an objective look at its existing businesses and the value added by the corporation. Only through such an assessment can an understanding of good corporate strategy grow. That understanding should guide future diversification as well as the development of skills and activities with which to select further new businesses. The following action program provides a concrete approach to conducting such a review. A company can choose a corporate strategy by:

1 **Identifying the interrelationships among already existing business units.**

A company should begin to develop a corporate strategy by identifying all the opportunities it has to share activities or transfer skills in its existing portfolio of business units. The company will not only find ways to enhance the competitive advantage of existing units but also come upon several possible diversification avenues. The lack of meaningful interrelationships in the portfolio is an equally important finding, suggesting the need to justify the value added by the corporation or, alternately, a fundamental restructuring.

2 **Selecting the core businesses that will be the foundation of the corporate strategy.**

Successful diversification starts with an understanding of the core businesses that will serve as the basis for corporate strategy. Core businesses are those that are in an attractive industry, have the potential to achieve sustainable competitive advantage, have important interrelationships with other business units, and provide skills or activities that represent a base from which to diversify.

The company must first make certain its core businesses are on sound footing by upgrading management, internationalizing strategy, or improving technology. My study shows that geographic extensions of existing units, whether by acquisition, joint venture, or start-up, had a substantially lower divestment rate than diversification.

The company must then patiently dispose of the units that are not core businesses. Selling them will free resources that could be better deployed elsewhere. In some cases disposal implies immediate liquidation, while in others the company should dress up the units and wait for a propitious market or a particularly eager buyer.

3 **Creating horizontal organizational mechanisms to facilitate interrelationships among the core businesses and lay the groundwork for future related diversification.**

Top management can facilitate interrelationships by emphasizing cross-unit collaboration, grouping units organizationally and modifying incentives, and taking steps to build a strong sense of corporate identity.

4 **Pursuing diversification opportunities that allow shared activities.**

This concept of corporate strategy is the most compelling, provided a company's strategy passes all three tests. A company should inventory activities in existing business units that represent the strongest foundation for sharing, such as strong distribution channels or world-class technical facilities. These will in turn lead to potential new business areas. A company can use acquisitions as a beachhead or employ start-ups to exploit internal capabilities and minimize integrating problems.

5 **Pursuing diversification through the transfer of skills if opportunities for sharing activities are limited or exhausted.**

Companies can pursue this strategy through acquisition, although they may be able to use start-ups if their existing units have important skills they can readily transfer.

Such diversification is often riskier because of the tough conditions necessary for it to work. Given the uncertainties, a company should avoid diversifying on the basis of skills transfer alone. Rather

it should also be viewed as a stepping-stone to subsequent diversification using shared activities. New industries should be chosen that will lead naturally to other businesses. The goal is to build a cluster of related and mutually reinforcing business units. The strategy's logic implies that the company should not set the rate of return standards for the initial foray into a new sector too high.

6 **Pursuing a strategy of restructuring if this fits the skills of management or no good opportunities exist for forging corporate interrelationships.**

When a company uncovers undermanaged companies and can deploy adequate management talent and resources to the acquired units, then it can use a restructuring strategy. The more developed the capital markets and the more active the market for companies, the more restructuring will require a patient search for that special opportunity rather than a headlong race to acquire as many bad apples as possible. Restructuring can be a permanent strategy, as it is with Loew's, or a way to build a group of businesses that supports a shift to another corporate strategy.

7 **Paying dividends so that the shareholders can be the portfolio managers.**

Paying dividends is better than destroying shareholder value through diversification based on shaky underpinnings. Tax considerations, which some companies cite to avoid dividends, are hardly legitimate reason to diversify if a company cannot demonstrate the capacity to do it profitably.

Creating a corporate theme

Defining a corporate theme is a good way to ensure that the corporation will create shareholder value. Having the right theme helps unite the efforts of business units and reinforces the ways they interrelate as well as guides the choice of new businesses to enter. NEC Corporation, with its "C&C" theme, provides a good example. NEC integrates its computer, semiconductor, telecommunications, and consumer electronics businesses by merging computers and communication.

It is all too easy to create a shallow corporate theme. CBS wanted to be an "entertainment company," for example, and built a group of businesses related to leisure time. It entered such industries as toys, crafts, musical instruments, sports teams, and hi-fi retailing. While this corporate theme sounded good, close listening revealed its hollow ring. None of these businesses had any significant opportunity to share activities or transfer skills among themselves or with CBS's traditional broadcasting and record businesses. They were all sold, often at significant losses, except for a few of CBS's publishing-related units. Saddled with the worst acquisition record in my study, CBS has eroded the shareholder value created through its strong performance in broadcasting and records.

Moving from competitive strategy to corporate strategy is the business equivalent of passing through the Bermuda Triangle. The failure of corporate strategy reflects the fact that most diversified companies have failed to think in terms of how they really add value. A corporate strategy that truly enhances the competitive advantage of each business unit is the best defense against the corporate raider. With a sharper focus on the tests of diversification and the explicit choice of a clear concept of corporate strategy, companies' diversification track records from now on can look a lot different.

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1 The studies also show that sellers of companies capture a large fraction of the gains from merger. See Michael C. Jensen and Richard S. Ruback, "The Market for Corporate Control: The Scientific Evidence," *Journal of Financial Economics*, April 1983, p. 5, and Michael C. Jensen, "Takeovers: Folklore and Science," HBR November-December 1984, p. 109.

2 Some recent evidence also supports the conclusion that acquired companies often suffer eroding performance after acquisition. See Frederick M. Scherer, "Mergers, Sell-Offs and Managerial Behavior," in *The Economics of Strategic Planning*, ed. Lacy Glenn Thomas (Lexington, Mass.: Lexington Books, 1986), p. 143, and David A. Ravenscraft and Frederick M. Scherer, "Mergers and Managerial Performance," paper presented at the Conference on Takeovers and Contests for Corporate Control, Columbia Law School, 1985.

3 This observation has been made by a number of authors. See, for example, Malcolm S. Salter and Wolf A. Weinhold, *Diversification Through Acquisition* (New York: Free Press, 1979).

4 See Michael E. Porter, "How Competitive Forces Shape Strategy," HBR March-April 1979, p. 86.

5 Michael E. Porter, *Competitive Advantage* (New York: Free Press, 1985).

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16

WHARTON REPROGRAPHICS

General Electric, 1984

*Professor **Francis J. Aguilar**, Professor **Richard G. Hamermesh**, and **Caroline Brainard** prepared this case as the basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation.*

When Jack Welch took office in April 1981 as the new chairman and chief executive officer of General Electric, he described his vision for the company he was going to lead:

> A decade from now I would like General Electric to be perceived as a unique, high-spirited, entrepreneurial enterprise . . . a company known around the world for its unmatched level of excellence. I want General Electric to be the most profitable, highly diversified company on earth, with world-quality leadership in every one of its product lines.

By 1984 Welch had regrouped sectors, invested heavily in both new and core businesses, divested from other GE businesses, changed the company's approach to planning, and cut back staff. According to the 1984 annual report:

> Across your company, a strategy has been formulated, with clear focus on our key businesses and where they're going. The resources are in place to get them there. And most important, an atmosphere, a culture, is being created where concepts like agility, excellence, and entrepreneurship—the real stuff of world competitiveness—are coming to life.

The results were impressive. Profits rose from $1.5 billion in 1980, the year before Welch became CEO, to $2.3 billion in 1984. The increase in earnings, credited to improved operating margins, had occurred despite only slight increases in sales over the same period. Increased profits had also gone hand in hand with increased investment in future growth. Funds for research and development programs in 1984 reached a record $2.3 billion, over 8% of sales. (*Exhibits 1-A, 1-B,* and *1-C* contain a financial summary.)

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GE often made the news, and a favorite pastime of the business press was to evaluate Welch's actions and plans. One article concluded with Welch admitting that he was "only at the 15% mark of what he intends to do."[1] He did not elaborate on the specifics of the 85% that remained to be accomplished. Regardless of the future direction he would take, virtually everyone agreed that GE had changed during Welch's first four years.

The Early Months

When Welch took office, he proclaimed that anything and everything was open to question. For example, what would the role of sectors be? How would strategic planning change? Would acquisitions play a greater or lesser role than in the past compared with internal development? Would the corporate staff play a greater or lesser role in transforming GE? Different answers to these questions would vie for attention and support, with Welch as the final arbiter.

He began by traveling throughout the $28 billion GE territory, meeting people, looking at operations, and asking questions. He returned to corporate headquarters in Fairfield, Connecticut, with a firmer idea of how he would proceed.

Several months later, in early August, Welch announced a restructuring of GE's organization, which had been in place since 1977. Two new sectors were created to implement the firm's commitment to grow its microelectronics and other technology-related businesses and to develop opportunities in its financial and information service businesses. The two sectors were called Technical Systems and Services and Materials. (See *Exhibit 2-A* for the entire organizational structure.)

Technical Systems combined all of GE's business units that made intensive use of microelectronics, such as industrial electronics, advanced microelectronics, medical systems, mobile communications, and aerospace. As such, the sector contained nearly all activities that were critically involved in GE's Factory-of-the-Future strategy.

Services and Materials combined some of GE's fastest-growing businesses, including GE Credit Corp. (GECC), whose recent earnings had been growing 18% annually; GE Information Services Co. (GEISCO), whose sales had been increasing 24% annually over the past 10 years; and the Engineering Materials Group, which had been growing at 20% annually. Besides pursuing growth, the sector was to seek opportunities for integrating GE's credit and information services offerings and operations.

This change in the sector structure accompanied a new approach to planning. Strategic planning reviews under Welch significantly departed from earlier practice in two respects. First, top management dealt directly with the strategic business units (SBUs) and not with the sectors. Replacing the larger meetings held in the past, Welch involved only the SBU manager and the responsible vice chairman in the review. Second, he directed the review around key issues for each business and not around comprehensive strategic documentation or planning concepts. For example, one issue that repeatedly surfaced in these early reviews was what each SBU would be doing to benefit GE in 1990.

Welch disclosed some of the reasons for these changes in a classroom discussion at the Harvard Business School on April 27, 1981:[2]

> One of the things that's happened is with our planning system. It was dynamite when we first put it in. The thinking was fresh; the form was little—the format got no points—it was idea-oriented. Then we hired a head of planning, and he hired two vice presidents, and then he hired a planner, and then the books got thicker, and the printing got more sophisticated, and the covers got harder, and the drawings got better. The meetings kept getting larger with as many as 16 to 18 people involved. Nobody can say anything with that many people around.
>
> So one of the things that we have put into place is a way to achieve more candor, more constructive conflict. So we've gone to what we're going to call CEO[3] meetings, where the three of us will have meetings with SBU managers, one on three, two on three, in a small room.

Welch did not believe, at the time, that one could describe an overall strategy for a company like GE. He said:

1. "General Electric—Going with the Winners," *Forbes*, March 26, 1984, p. 106.

2. "General Electric Co.: Jack Welch and Standley Hoch" 5-182-024. Transcript for videotape HBS No. 9-882-004.

3. Corporate Executive Office: Chairman Welch, Vice Chairman J. Burlingame, and Vice Chairman E. Hood.

> Everyone likes to ask me what's the strategy for General Electric. Well, how can you have a strategy for a company that in the last five months has committed a billion and a half dollars in Montgomery, Alabama, for plastics plants; has made five acquisitions of software companies; has put $300 million into Erie, Pennsylvania, to expand a locomotive operation; has built a microelectronics center in North Carolina; and has opened a new copper-exploration venture in Chile with Getty. There is no neat bow one can put on this.
>
> But one can set an objective, one central theme to run through every bone of that company, every corner of it, every person in it, and that is—look at where you are in '82, where you'll be in '85, and probably, more importantly, where you'll be in '90. The issue facing every one of the people who manage our business is, can you be number one or number two in the game you're going to play, in the war you're going to wage, in the skirmish you're going to be in? Can you clearly go to war, go to the skirmish, with good equipment, good arms, good troops, with anything else you want to use as a metaphor? Can you play in that arena as a number one or number two player?[4]

For Welch, being number one or number two meant stressing quality and excellence. He made the following comments to GE managers early in his tenure:

> To me quality and excellence mean being better than the best. This achievement requires an introspective assessment of everything we are, do, say, or make, and an honest inquiry, "Are we better than the best?" If we aren't, we should ask ourselves, "What will it take?" then quantify the energy and resources required to get there. If the economics, the environment, or our abilities determine that we can't get there, we must take the same spirited action to disengage ourselves from that which we can't make better than the best.

Becoming Number One or Number Two

During his first four years, Welch pursued his plan for being "better than the best" by building businesses through acquisition and internal development and by exiting businesses that could not meet the test of being number one or number two. Within this broad spectrum of efforts to reallocate GE's resources, Welch primarily concerned himself with building those areas designated for growth, specifically microelectronics and financial/information services. These businesses would most change GE's configuration.

Building Growth Businesses

Factory automation was targeted for development. Estimating the world market for automation at $30 billion by the early 1990s, GE announced in 1981 that it would spend $500 million to become a "world supermarket of automation."

James A. Baker, the sector executive of Technical Systems and the oft-quoted spokesperson for the company's move toward automation, referred to the concept as the Factory of the Future. Baker warned industry leaders that they would have to "automate, emigrate, or evaporate." He spoke of the need for automation and the part GE would play:

> Automation is the last best hope for American industry and must be pursued no matter what the cost. The choice is biting the bullet or biting the dust. . . . There are few options left. And what we're telling you is that we can do it better than anyone else.[5]

Calma and Intersil, acquired several months before Welch took office, filled in some of the gaps in GE's high-technology capabilities. Calma was the world's fourth-largest manufacturer of CAD (computer-aided design) systems and produced CAM (computer-aided manufacturing) systems as well. CAD/CAM systems, able to cut production time in half, would provide the operating mechanisms for the Factory of the Future. Calma, growing at a rate of 40% annually, was purchased for $100 million down and $70 million to be paid later from earnings.

Intersil, one of the world's major manufacturers of integrated circuits, cost $235 million. The acquisition was GE's second entry into the integrated circuit industry. Twenty years earlier, GE had been one of the first manufacturers of integrated circuits but had exited the business after selling its mainframe computer business in 1970. Intersil provided state-of-the-art semicon-

4. Transcript No. 5-383-002, "General Electric: Jack Welch Transcript," comments to a class of Harvard Business School students, December 4, 1981.

5. *Stock Market Magazine*, April/May 1982.

ductor technologies for GE and non-GE products and systems.

The highly touted success of Japanese manufacturing seemed to assure major growth for factory automation in the Western world. Notwithstanding this favorable outlook, GE continued to look for a breakthrough in the field. Its 1983 annual report stated that the large development expenses associated with its drive for world leadership in automation, coupled with flat sales in industrial electronics because of the slow economic recovery, had caused losses of nearly $40 million during the year. In 1984, a similar loss was reported on "modestly improved revenues."

Another area that GE had targeted for high-technology growth was medical systems. GE was the number one manufacturer of diagnostic imaging equipment worldwide. In the early 1970s, GE turned its lackluster X-ray business around by putting an advanced CAT (computer-assisted tomography) scanner on the market, which soon had worldwide market share approaching 70%. In the early 1980s, GE developed a Nuclear Magnetic Resonance (NMR or MR) imaging device that used a powerful magnet to produce cross-sectional photos of the body's tissue, painlessly, without X-rays or surgery. An MR machine pinpointed areas missed by a CAT scan, since it could "see" through solid mass.

An indication of GE's competitive strength in the field was given in the following account about Johnson & Johnson's Technicare Corp. "In MR scanners, for instance, GE's Welch makes no bones about his willingness to spend whatever it takes to be the leader. Technicare president, Joseph G. Teague, however, says: 'We don't have it as a realistic strategy to be number one,' in the U.S. in several years. Matching GE's expenditures dollar for dollar, he adds, could be 'frivolous and very expensive.'"[6]

Besides the MR scanner, the Medical Systems Division was developing a lower-cost, simpler version of its CAT scanner. Total funds invested in both projects topped $100 million.

GE carried the supermarket concept over to its information services, with the goal of becoming a "supermarket of software services." GEISCO (GE Information Services Co.) launched a program to acquire computer software companies to strengthen its business portfolio in five target areas: banking, manufacturing, financial services, management reporting, and energy. Total funds for acquisitions and investments in key service businesses amounted to $650 million in 1983.

Building Core Businesses

Despite all the investments in the more glamorous growth businesses, GE did not ignore its older, core businesses where special opportunities could be found. In practice, many of these opportunities were connected to GE's high-technology thrust into the Factory of the Future. As one sector executive noted, "We never appreciated just how profitable a 2% growth business could be when automated."

In a speech in 1982 to the Association of Iron and Steel Engineers on the topic of revamping basic industry, James Baker advised his audience, "Go back to your mills. Look at the operation as if you were preparing to serve a growth market and ask yourself if its yield . . . and particularly its quality . . . is what it should be."

GE itself took Baker's advice, automating many of its older plants to keep them number one or number two. A $300 million project to automate the firm's 70-year-old locomotive facilities in Erie, Pennsylvania, was the largest such investment in GE's history.

Between 1980 and 1983, the company spent close to $500 million modernizing its major appliance group. A $38.6 million investment set up a CIM (computer-integrated manufacturing) system in the dishwasher plant, automating production from order to delivery. The showcase factory was to be a model for other appliance operations, such as the refrigerator plant, which was scheduled to be gutted and refitted for robot assembly at a cost of $100 million. Another $135 million was slated to expand and automate the production of a new rotary compressor for use in GE refrigerators and small air conditioners. Similar investments were planned for the next four years amounting to $800 million.

The locomotive and dishwasher units were named by *Fortune* as being among America's 10 best-managed, most efficient factories. The article reported on the automation of the locomotive plant, "The payoff has already been impressive: automation has saved the huge Erie

6. "Changing a Corporate Culture," *Business Week*, May 14, 1984, p. 132.

works from extinction and propelled GE into the front ranks of the world's locomotive manufacturers."[7]

In some instances, business development was more than investments in plant and equipment, it was a shift in the manufacturing base. For example, the decision t- consolidate GE's lamp operations and invest $250 million to modernize production closed 10 plants in five states and reduced the work force by 1,400 employees.

Exiting Businesses

While GE was building businesses, it was also examining those businesses that could not meet the challenge of being number one or number two. If the analysis showed top management that additional investments could not promote a good return and competitive success, the decision was made to divest. As a result, GE sold off 118 businesses from 1981 through 1983, for more than $3.5 billion.

One of the most newsworthy divestitures was the sale of Utah International, an Australian coal property that had been a sector by itself, for $2.4 billion. The sale was announced in October 1983 and was finalized in April 1984. *Forbes* commented on the sale, "Utah International was a highly profitable property producing coking coal, but GE saw no future in it. Vice Chairman John Burlingame, one of Welch's former rivals for the top job, handled the negotiations with the Australians and says, 'There are better places that we would rather put our money and effort. The more so since Utah's main market, coking coal for steel, is depressed and in surplus capacity.' GE kept just one part of Utah, Ladd Petroleum, as insurance for GE's plastics needs."[8]

The press also took note at the end of 1983 when GE sold its housewares division to Black & Decker for $300 million in cash and notes. The division, which produced small appliances, such as irons and toaster ovens, had been part of GE since the early 1900s. GE explained that the divestiture allowed the consumer sector to concentrate its resources in the major appliance line. Even though GE had the dominant market share in small appliances, its profits were still below company averages.

In 1982, GE also began exiting from one of its more recent business entries, nuclear plant construction. The company accepted no new plant orders, agreeing to fulfill a backlog of orders stretching into the 1990s. Because of earlier commitments, it would remain in the nuclear fuel business and the nuclear plant servicing business after the backlog was fulfilled.

Other divestitures included the sale of all but one of GE's broadcasting outfits, spurred by the success of competitors. Vulnerability to housing cycles was the factor in the sale of the residential central air-conditioning business to the Trane Company for $150 million in cash and 15% of Trane stock. However, GE decided to remain in the small air conditioner business (units for windows and walls) because of its strong competitive position.

The Three-Circle Concept

As GE built and exited businesses, Welch grappled with the problem of finding a concise way to talk about GE to managers and outsiders. He wanted a concept that would have strategic meaning for GE as well as providing a simple description of what the company *was* as well as what it *was not*.

As Welch and corporate management looked at potential acquisitions and divestitures in 1983, a notion of major business configuration began to emerge. The result was a conceptualization of the company competing in three areas.

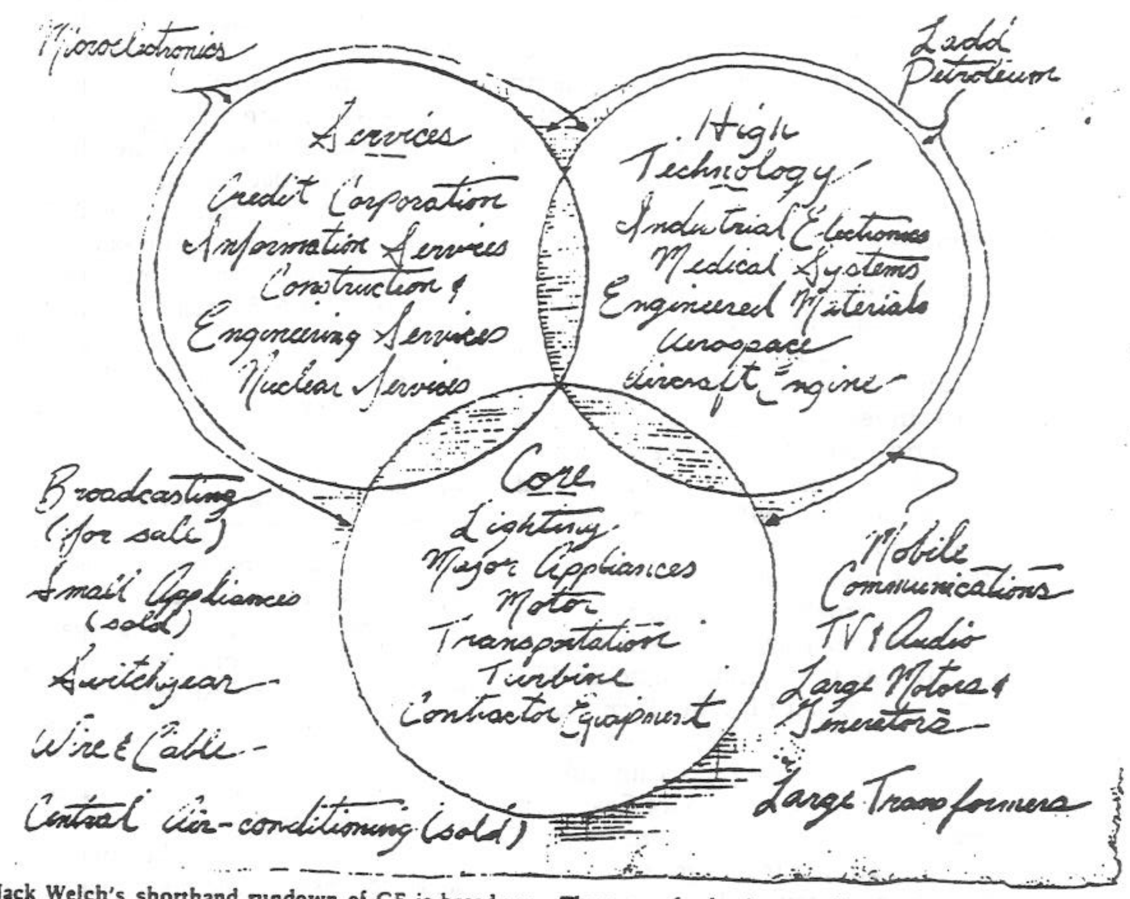
In the three-circle concept, as it came to be called, all businesses were divided into (1) core, (2) high-technology, or (3) service areas. *Only* businesses that dominated their markets would be placed in one circle or another. Fifteen businesses qualified (see *Figure A*). Those outside these circles—the businesses that did not meet the criteria of being number one or number two—either had to come up with a strategy to get in a circle or be divested.

Investment planning became aligned with the three-circle concept. Welch announced the strategies in the 1983 annual report. The six core businesses focused on "reinvestment in productivity and quality," while the five high-tech businesses made certain that they stayed "on the leading edge through a combination of synergistic acquisitions and substantial investments in R&D." In the key service businesses, the strategy was to "grow these opportunities by adding outstanding people, who often can

7. "America's Best-Managed Factories," *Fortune*, May 28, 1984, pp. 20–21.
8. "General Electric—Going with the Winners," *Forbes*, March 26, 1984, p. 98.

Figure A The Three-Circle Concept

The shape of the new GE



Jack Welch's shorthand rundown of GE is based on three circles, covering the traditional "core" businesses (around 33% of profits), the high-technology businesses (30% but rising) and the services (29%). Around these main groupings lie the remainder of the businesses. Some are profitable, some lose money. Among them, they account for around 13% of sales.

These are the businesses that Welch has told to fix themselves, to become top players in their league, or they'll be sold or closed. Some, like microelectronics or Ladd Petroleum, have links to all three main business circles. They are not on the threatened list. Some, like small appliances or central air-conditioning, have already been sold or are planned to be.

Source: "General Electric—Going with the Winners," *Forbes*, March 26, 1984, p. 106. Reprinted by permission of *Forbes* magazine, © 1984, Forbes, Inc.

create new ventures all by themselves, and by making contiguous acquisitions."

Welch said of the three-circle concept:

> We have our hands on a simple, understandable strategy for where we are, where we are not, where we can't find a solution, and where we have to disengage. We have to get used to the idea that disengaging does not mean bad people or bad management—it's a bad situation, and we can't tie up good resources, good dollars, chasing it.

In GE's thinking, the three circles were interrelated. The core businesses needed advanced process technology and strong service offerings to improve their competitiveness. High-tech companies served customers who were looking for solutions to problems as well as products, so that a linkage with services was important for maintaining a competitive edge in the industry. In turn, service businesses could not remain competitive without the benefits of the latest technology.

The Changing GE Organization

Besides the evolution of GE's strategy, structural and administrative changes occurred under Welch's chairmanship. Destaffing received considerable press coverage. Other important areas of change were planning, organization structure, and incentives.

Destaffing

When Jack Welch took office, the U.S. economy was in its deepest decline since the Great Depression. Besides this external pressure, Welch came to the chairman's office with the sense that GE's bureaucracy and the levels of organization and staff had grown too large. As a result, he emphasized what became known as destaffing. From 1980 to 1984, the total work force was reduced from 402,000 to 330,000. Of this total, about 37% could be attributed to cutbacks in businesses experiencing lower sales volume. The remaining reductions represented a conscious effort to reduce staff and levels of organization.

These efforts earned Welch the nickname of "Neutron Jack" in the press, an allusion to the neutron bomb, which wiped out people while leaving the buildings intact. Although Welch believed the label to be exaggerated, he was convinced that a company the size of GE needed to stay "lean and agile" to be competitive. Welch acknowledged that becoming lean required destaffing, but he stated that GE had no intention of becoming "mean" in the process. He felt that GE had a responsibility to people who were not needed and that any action should "pass the fairness test that we'd like to be treated with ourselves." *Crain's Cleveland Business* of July 11, 1983, conceded that GE had used a "humane ax" in laying off 1,500 Ohio workers. The article pointed to the firm's offers of job counseling and placement alternatives and its efforts to explain "the inescapable necessity of it all."

Planning

As already noted, two changes Welch made in the planning process were to reinstate direct SBU reviews and to focus the reviews around key issues. Welch also advocated less reliance on staff. The planning staff of 200 in 1980 had been cut in half by 1984. The purpose was to have "general managers talking to general managers about strategy, rather than planners talking to planners."

Welch therefore dropped the requirement that every business have a strategy approved each year. A stable business with an approved strategy in place would only have to be reviewed every two to three years. A business in a dynamic environment with changing strategies would be under continuous review.

Mike Carpenter, GE's recently hired vice president of corporate planning, having spent the previous decade as a vice president of the Boston Consulting Group, explained these changes:

> I've tried to separate strategy and planning. Strategy is thinking through the basics of a business; planning is developing programs to support those strategies. I've been trying to put more emphasis on strategies and less on formal planning. Most of my staff is spending its time looking for acquisitions. When we do get involved in SBU strategies, it's as a member of the team working to develop viable, competitive strategies for the business. We spend little staff time consolidating or comparing plan books.
>
> Many of the changes in planning were begun before I joined the company. The objectives of the changes are to debureaucratize the process, focus the process on strategy, make it an ongoing process which is responsive to the time-frame needs of the business, make it the general manager's process, not the planner's process, and make it selective. This has implied some significant changes for the role of my organization. The most important being that we are no longer the corporate policeman, and our relationship with the SBUs is cooperative, not adversarial.

Organization Structure

When Welch became chairman in 1981, GE was administered by six sector organizations reporting to the Corporate Executive Office. By 1984, the sectors had been reduced to four and several major businesses reported directly to the CEO. As shown in *Exhibit 2-B*, medical systems, financial services, and plastics were among the businesses reporting to the CEO. A senior executive commented, "No one is quite sure what the role of the sectors will be in the future. My hunch is that they will slowly disappear and eventually the 15 major businesses that fall

within the three circles will all report directly to the Corporate Executive Office."

In mid-1984, John Burlingame, one of the vice chairmen, announced his planned retirement at the end of the year. Larry Bossidy, formerly sector executive for Services and Materials and the individual most often associated with the growth and success of the General Electric Credit Corporation, was promoted to vice chairman and a member of the CEO.

Welch considered choosing good people to be his most important job. Accordingly, he extended and increased his role in both the selection and review of key managers.

Incentives

Welch sought to institute new incentives to recognize employees for their individual contributions. For example, Corporate Executive Office (CEO) Awards were given to individuals who made special one-time contributions to a business venture, project, disposition, acquisition, and so forth.

Special Stock Option Awards were developed to help build long-term identification with the company for new people, to retain key individuals in an acquired company, to reward a long-term contribution made by individuals not eligible for regular stock-option grants, and to induce individuals to either take or stay in an unusually difficult or high-risk position.

Other incentives included restricted stock and special bonuses for meeting sales and income objectives in key positions in critical new businesses.

Welch's Philosophy

As the strategic moves and changes to organization and management processes occurred during the four years of his chairmanship, Welch was forming a management philosophy. Over time, Welch had coalesced his thinking around 10 key company values, which he described at a corporate officers meeting in the fall of 1983. Being number one or number two headed the list, followed by becoming and staying lean and agile. The remaining eight fell into three categories: how to get to the top, how to behave as a company to stay there, and how to fund the process.

Getting to the Top: Ownership, Stewardship, and Entrepreneurship

Welch believed that one of the keys to GE's success was a sense of pride in the company, such as that exhibited at several plants where employees wore T-shirts reading "GE is ME." He called this ownership. He tried to encourage ownership behavior by giving greater powers of delegation, by raising capital appropriations levels, and by holding fewer and faster reviews. His aim was to drive the ability to act further down in the organization.

> If we can think of ownership as just saying more "Grab it! Run with it! Take responsibility. Make the decision. Give the management awards. Make the sales plans. Do the things you want to do to run your business faster every day," we've got something.

Stewardship, which had been a popular word at GE for 20 years, was the responsibility that accompanied ownership. It was not only an obligation toward GE's assets (i.e., people, buildings, balance sheets) but it was also working at capacity to further the company's competitive success. Welch said:

> Stewardship is an obligation. It's not some noblesse oblige attitude where people can work at 45% to 50% of capacity or believe they have lifetime employment. Stewardship is working at 100% to 150%. Stewardship in the end is what your jobs are all about. It's your challenge: to take the assets you have, drive them to newer and better heights through excellence, through taking charge, and make this enterprise better in 1990 than it is today.

Entrepreneurship was the kindling with which Welch wanted to start the fires of the other values leading to competitive success. To attain ownership and stewardship, he advocated that managers create and maintain an entrepreneurial environment and a sense of entrepreneurial responsibility. Because the risks and rewards were not the same for entrepreneurship in a $30 billion enterprise as they were in a small company, he conceded that the term might be a misnomer. The concept, nonetheless, was essential to allow new ideas to surface and to create new ventures for the company.

How to Behave: Excellence, Quality, Reality and Candor, and Communications

Having a company ethic dedicated to ownership, stewardship, and entrepreneurship could get GE to the first spot in a tough, competitive world, according to Welch, but other values would keep it there.

Excellence, like ownership, was a behavior at the individual level. Welch suggested the best way to measure excellence was the "mirror test":

> This is the one, whether you're putting on make-up or shaving, where only you know whether or not the excellence is there—is absolutely at the heart of your everyday activity. You can't be at this level at all times, but you've got to keep driving yourself. Are you setting the standards of excellence? Are you demanding the very best of yourself?

Quality was accomplished by the individual excellence of every GE employee. Product quality had always epitomized GE's policy, but Welch wanted to push that value beyond the product to instill a commitment to quality as a pervasive way of life, to have an all-embracing concept that included products, services, fulfillment of citizen responsibilities, and communication to the outside world.

Excellence and quality could not be realized if there was no atmosphere allowing reality and candor. The early move to have one or two SBU managers meet with the CEO was made to foster a willingness to share problems and develop trust in the corporate hierarchy. Welch believed that, at every level, each employee should have enough trust in his or her boss to seek a joint solution to a problem and should have enough self-confidence and belief in the company to approach that process with reality and candor. Trust was critical to the concepts of quality and excellence.

Besides the internal dialogue necessary for successful operations, Welch felt that communicating GE's strengths and values to the outside world was central to implementing GE's philosophy. Understanding, embracing, and being able to articulate to the financial and shareholder communities what GE was doing was essential to successfully remaining number one or number two. To understand and communicate GE's philosophy, Welch said, "You've got to embrace it, feel it, believe it. If you don't, you come back and recheck it and understand what we're doing. Without that group in Louisville or that group in Cleveland, everybody embracing what we're going to do, we haven't got a prayer."

Funding: The Investment Philosophy

The values that focused on getting to the top and staying there were necessary but insufficient without the financial support to bring them to fruition. The tenth value of Welch's management philosophy dealt with how to pay for competitive success.

Welch believed that all investments should be directed only to the markets that GE *could* dominate. Those markets that did not fit the long-term growth strategy would be abandoned. He set 15% as the overall annual growth rate, with the admonition that short-term investment decisions should not be made simply to meet the growth rate at the expense of long-term issues.

Reactions

In a company as large and diverse as GE, reactions to Welch's first four years as CEO were bound to be varied. The following sample of comments from GE managers gives some idea of the range of impressions and judgments to be found in the GE organization:

> There was a lot of resentment to the destaffing in my department and Welch was feared. But personally, I welcomed it. I knew we had deadwood, and I was happy that we were being forced to face up to it.

> All the words sound great—entrepreneurship, ownership, risk taking—but at my level [subsection manager] it's making budget that still counts.

> During the first two years, I didn't see much change. But then we got a new general manager who is right out of Welch's mold. Our business is now a different place—much more spirited, self-critical, and energetic.

> I don't see much change. My business has been in the fast-moving part of the company, and we've been managed this way for

> years. I think that some of the older parts of the company may be feeling some change, but for me it's been a continuation of the way things have always been and the way they should be.

> Welch has succeeded in keeping us from becoming complacent and is focusing our attention on worldwide competitors. That's an important accomplishment in a big company where we tend to become complacent and focus on our own organizations and promotions.

> Many of the changes [in planning] have been excellent. But we are relying almost totally on people. That's fine until some of those people make big mistakes. Then we may miss not having those systematic plans.

> The key issue for me is what happens if you take a risk and fail. Welch is trying hard to convince us that it's OK as at Halarc.[9] But I wonder. The people who get rewarded in a failure are those who recommend getting out, not those who recommended getting in.

Issues

Among the many issues faced by GE management since Welch had become CEO in 1981, two had garnered extensive publicity. One issue addressed the huge funds GE had accumulated for investment. The other issue involved Welch's desire to increase the level of risk taking and entrepreneurship within the company.

The $5 Billion War Chest

At the end of 1983, GE had $2.5 billion in cash and securities. With the sale of Utah International, that amount rose to over $5 billion, prompting questions about whether or not GE would join the current trend toward major acquisitions. Welch responded in the 1983 annual report: "The question has been raised: What will we do with the money? The short answer is: It's not going to burn a hole in our pocket."

In 1983, GE had used a data base of 6,000 potential candidates to identify potential acquisition candidates. The business development staff conducted an in-depth analysis of more than 100 large candidates within this group, identifying only four as strategically and financially attractive.

Guidelines for analysis had been laid out by corporate planner Mike Carpenter. The most important criteria was that ownership by GE should increase shareholder value by causing the acquired company's growth rate or profitability (or both) to increase over what it otherwise would have been. He pointed out that the acquisition would have to create enough value to pay the acquisition premium, noting that premiums had increased to 50% from 20% in 1970. "Acquisitions take place in a marketplace like any other [business deal]," he said. "It's tough making good acquisitions when you have to pay a 50% premium."

To emphasize this point, Carpenter described how he and his staff had ruled out several large ($1 billion to $8 billion) high-technology candidates as overpriced. According to their analyses, the share-price premiums needed to complete these acquisitions placed in doubt GE's ability to earn an attractive return on its investment.

Although Carpenter stressed that the highest return would come from those acquisitions that built on the strategic strengths of GE's existing businesses, he advised against limiting thinking to a certain size of possible acquisitions or to those that would fit neatly into the current GE boundary lines. He said, "We can acquire businesses bigger than our existing ones. We can acquire businesses that cut across group or sector boundaries. We can acquire particular businesses from large companies. We can acquire companies where only specific pieces are of interest to us."

In the spring of 1984, GE Credit Corp. announced the purchase of Employers Reinsurance Corp. for $1.08 billion, expanding GE's financial services activities. Carpenter explained the thinking behind the acquisition and how the opportunity arose:

> We have analyzed many financial services businesses in the last year or so and reinsurance has consistently come near the top of the list in terms of growth, return on investment, and competitive defensibility. It's a business GE knows through its Puritan Insurance Company [a subsidiary of GECC], although we have been a small player in the

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9. See the *Appendix* for a description of the Halarc venture.

> past. In looking at the largest 250 financial services companies and screening them for business attractiveness and company performance (in terms of return on investment and growth), ERC was identified as a member of an elite group of top-performing financial services companies. ERC is the number two or three reinsurer in the U.S. and has grown more rapidly and earned higher returns—a 24% return on equity in reinsurance—than the leader, General Re. Nevertheless, we're buying the company at the same multiple (1.9 times book value) that General Re shares sell for in the stock market at what we believe is at or close to the bottom of the reinsurance cycle.
>
> Interestingly, the original idea for the ERC acquisition came from Puritan Insurance. At an early stage in the game, my organization got involved, tried to help them evaluate the acquisition, and framed the issues that needed to be addressed before raising it with the CEO. But I think it is important to note that one of our smaller, farther-flung entities was the prime mover in the largest acquisition GE has made in recent years.
>
> ERC became available when its parent, Getty Oil, was acquired by Texaco, which wanted to concentrate on historic businesses in the oil and gas industry. We negotiated with Texaco to buy ERC at a price we thought was fair.

Despite the ERC acquisition and numerous smaller acquisitions (GE had acquired over 50 businesses since 1981), how GE would spend its considerable cash reserves remained unclear.

Internal Growth

Closely related to the problem of investing GE's cash reserves was the issue of encouraging internal growth, new business development, and entrepreneurship within the company. Welch stressed these developments and attempted to foster them in several ways: encouraging investments in growth businesses; reinforcing the organizational values of entrepreneurship, ownership, and stewardship; and changing compensation practices.

Besides these efforts, Welch emphasized new business ventures within the corporation. Although these ventures were not funded at the corporate level, the ventures focused attention on between 60 to 80 new business development efforts and their managers. Indeed, Welch often commented on the importance of ventures in developing managers:

> The ventures are far less important than the product of the processes, which are the people. By having high visibility on these people—each having their own P&L statement, their own game, competing against the world—we get a chance to look at how they perform. They can blow it and they lose a little money, it doesn't matter. We get a feel for who they are and what they can manage. We get far more out of the people end of ventures than we do out of the earnings end.

GE intentionally publicized venture activities to encourage managers to propose their own ventures. For example, a recent issue of the *GE Monogram*, the company magazine, highlighted three particular ventures (see the *Appendix*). Nevertheless, Welch was probably correct in stating that GE got less out of the earnings end of ventures than the people end. For on the earnings side, ventures not only faced the problems inherent in any start-up business but also had the added problems of being part of a big company and dealing with existing organizational boundaries. For example, the company's cogeneration venture had dealings with five GE businesses and nine departments. Finally, even if a venture was successful, there remained the problem of size. As one executive noted, "We have a problem with ventures because of our need to think big. At GE unless you can create a $150 million business it's not going to affect things much. We can create lots of small businesses. The problem is in creating the $150 million departments, and even more important creating the groups and sectors of the future."

Financial Systems

Although some of the problems in creating internal business development only pertained to ventures, many managers indicated that GE's financial systems had a more pervasive negative effect on entrepreneurship. As one manager noted, "More than ever before, we are being told to innovate and invest for the long haul. But our financial system tells us to make our quarterly and annual projections. At times, the profit pressure is intense."

Traditionally, GE's financial systems had centered around the annual budget for each operating unit. The preparation of these budgets,

leading to a set of figures by December, began in July and involved extensive negotiation between the operating units, the intervening layers of management, and the corporate office. An operating unit's budgeted net income, the bottom line, had generally come to be regarded as a commitment that each general manager would meet "at all costs.' Dennis Dammerman, GE's chief financial officer, described some of the problems that the company experienced with this approach to budgeting:

> The stress on making your numbers had some unfortunate consequences for us. First, because it was so important to meet your budgeted commitments, there was a lot of gaming going on on the part of the operating managers to get a low enough target. Then, once the budgets were set, some operating managers would resort to dysfunctional actions when necessary to meet their targets. For example, if a business experienced a downturn in demand, important development programs might be halted. This behavior obviously flies in the face of our efforts to make this a more entrepreneurial company.
>
> Jack Welch was also dissatisfied with a budgeting system which locked us into a set of figures prepared 18 months in advance of their use. This practice didn't enable us to respond to new opportunities that arose in the interim.

To address these problems, two changes were introduced into GE's budgeting process. First, the controller's office prepared a set of financial objectives for each operating unit. These targets were based on an analysis of economic forecasts and of ongoing programs and commitments at each of the operating units. Although the operating units were free to suggest revisions to the proposed target, the intent was to reduce the amount of game playing and bargaining over targets and to establish targets that more realistically reflected each unit's prospects.

Second, relabeling budgets as operating plans in 1984 contributed further to realistic target setting. Operating managers would now be free to propose a revision of the figures at any time that business conditions or the competitive situation changed significantly from the original assumptions. This change was intended to provide operating management with a more flexible structure under which he or she could respond to new opportunities or unexpected setbacks. Performance evaluation was made against the revised targets. The new approach also served to bring new developments to top management's attention.

Dammerman commented on these changes:

> The changes we have made in our financial system reflect Welch's desires to have GE responsive to changes in the environment and to new opportunities, and to have important resource allocation trade-offs surface to the top of the organization.
>
> Overall, I would rate the underlying concepts of our new approach to be quite good. Our execution to date, however, has left a lot to be desired. One undesirable result has been the inclination of our operating units to call in changes without adequate documentation. And, as you might expect, we are more likely to receive calls from businesses in trouble than from those experiencing better-than-planned-for results. When the troubled businesses submit new operating plans, they often call for lower revenues, unchanged expense levels, and lower net income. Under the old system there was no question that people would respond to the lower sales forecast by cutting costs in order to meet net income. We seem to have lost some of the commitment to fixing problems that we used to have from our general managers.
>
> Despite these problems, we are committed to making the concept of operating plans work, because we are convinced that it is consistent with developing a more responsive and entrepreneurial climate within the company.

Exhibits Begin on Next Page.

Exhibit 1-A Five-Year Statistical Summary, 1980–1984 ($ millions, except per share amounts)

	1984	1983	1982	1981	1980
Sales of products and services to customers	$ 27,947	$ 26,797	$ 26,500	$ 27,240	$ 24,959
Operating margin	2,345	2,549	2,405	2,447	2,243
Operating margin as a percentage of sales	10.2%	9.5%	9.1%	9.0%	9.0%
Earnings before business restructurings, income taxes, and minority interest	$ 3,501	$ 3,063	$ 2,753	$ 2,660	$ 2,493
Net earnings	2,280	2,024	1,817	1,652	1,514
Net earnings as a percentage of sales	8.2%	7.6%	6.9%	6.1%	6.1%
Net earnings on average share owners' equity	19.1%	18.9%	18.8%	19.1%	19.5%
Net earnings per share	$ 5.03	$ 4.45	$ 4.00	$ 3.63	$ 3.33
Dividends declared per share	2.05	1.875	1.675	1.575	1.475
Total assets	24,730	23,288	21,615	20,942	18,511
Property, plant and equipment additions	$ 2,488	$ 1,721	$ 1,608	$ 2,025	$ 1,948
Average employment—worldwide	330,000	340,000	367,000	404,000	402,000
—United States	241,000	245,000	261,000	289,000	285,000
Gross national product (current $ billions)	$ 3,661	$ 3,305	$ 3,073	$ 2,938	$ 2,626
Common stock performance					
GE common share price	$59⅜–48¼	$58⅞–45⅜	$50–27½	$35–25⅝	$31½–22
Dow Jones Industrial Average	1287–1087	1287–1027	1070–777	1024–824	1000–759
Standard & Poor's Industrial Index	170–147	173–138	143–102	138–113	140–98

Source: General Electric annual report, 1984; U.S. Department of Commerce for GNP, Moody's.

Exhibit 1-B Industry and Geographic Segment Information ($ millions)

	Total Revenues					*Net Earnings*					*Assets*			*Plant, Property and Equipment Additions*			*Depreciation, Depletion, and Amortization*		
	1984	*1983*	*1982*	*1981*	*1980*	*1984*	*1983*	*1982*	*1981*	*1980*	*1984*	*1983*	*1982*	*1984*	*1983*	*1982*	*1984*	*1983*	*1982*
Consumer products	$ 3,858	$ 3,741	$ 3,943	$ 4,202	$ 3,998	$ 228	$ 163	$ 146	$ 225	$ 241	$ 2,382	$ 2,297	$ 1,997	$ 283	$ 235	$ 180	$ 143	$ 120	$124
Major appliances	3,650	3,078	2,751	3,132	3,012	223	156	79	82	104	1,370	1,030	1,101	111	80	78	75	68	73
Industrial systems	4,274	4,228	4,705	5,364	4,907	73	84	148	212	218	2,670	2,569	2,478	264	228	251	151	158	139
Power systems	6,010	5,878	6,093	6,015	5,703	486	439	384	242	223	3,689	3,242	3,574	243	252	228	179	173	185
Aircraft engines	3,835	3,495	3,140	2,950	2,660	251	196	161	149	141	3,317	2,523	2,174	356	218	140	136	129	93
Materials	2,241	2,060	1,791	2,050	1,877	262	182	148	189	170	2,362	2,030	1,682	425	231	243	149	147	120
Technical products and services	4,803	3,825	3,546	3,005	2,424	232	210	218	144	99	2,778	2,052	1,698	340	216	198	166	124	106
Financial services[a]	448	397	286	239	193	336	285	203	145	126	2,312	1,929	1,634	—	—	—	—	—	—
Natural resources	609	1,579	1,575	1,722	1,374	117	301	218	284	224	946	2,558	2,565	347	162	237	67	122	114
Corporate items and eliminations	(792)	(598)	(638)	(825)	(625)	72	8	12	(20)	(32)	2,904	3,058	2,712	119	99	53	34	43	30
Total	$28,936	$27,683	$27,192	$27,854	$25,523	$2,280	$2,024	$1,717	$1,652	$1,514	$24,730	$23,288	$21,615	$2,488	$1,721	$1,608	$1,100	$1,084	$984
Outside the United States	$ 7,703	$ 9,148	$ 9,412	$10,190	$ 9,597	$ 419	$ 668	$ 680	$ 574	$ 639									

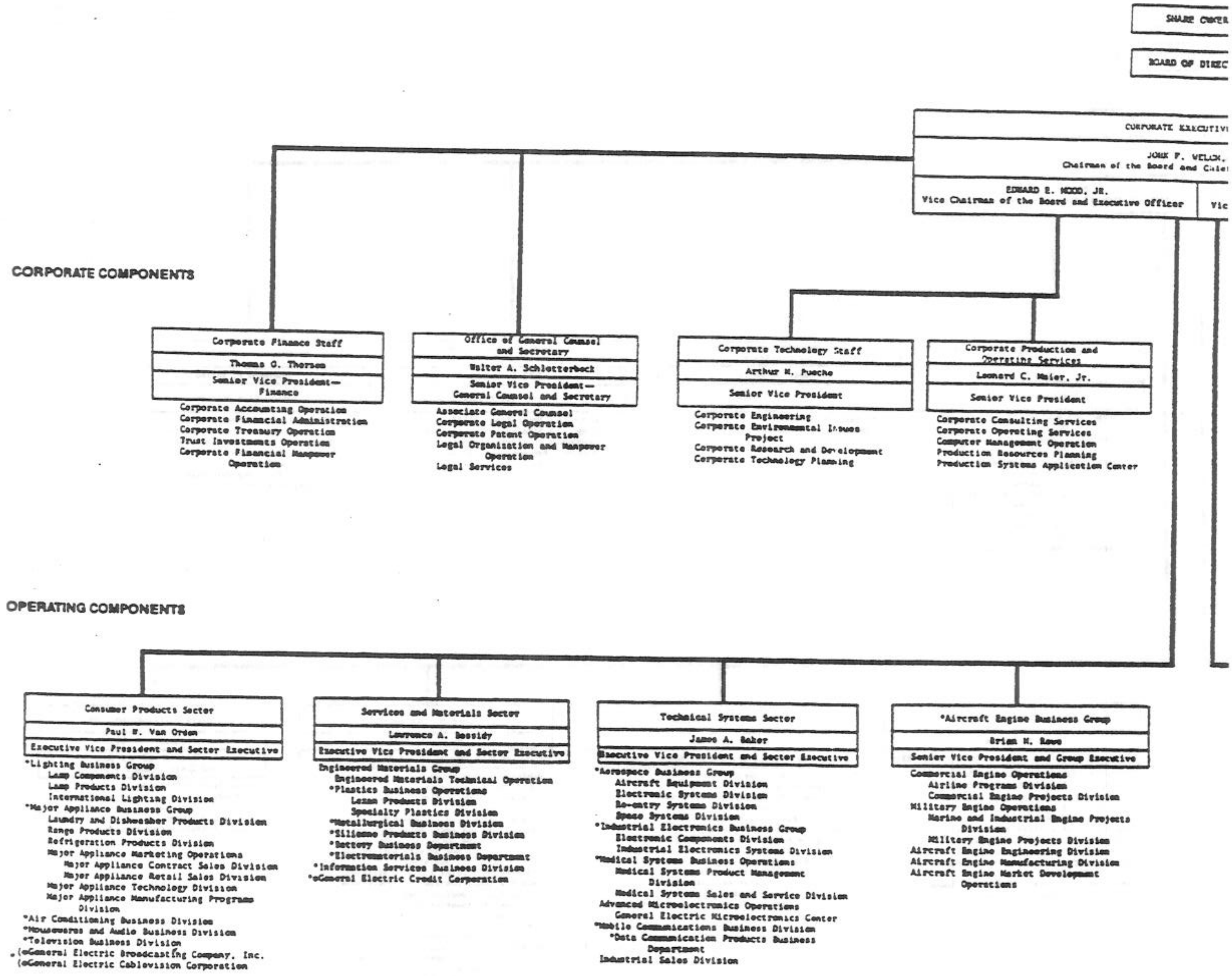
a. Note 4 of 1984 and 1982 annual reports explain GE's income from financial services and other sources as follows:

Other Income ($ millions)	*1984*	*1983*	*1982*	*1981*	*1980*
GECC	$329	$271	$205	$129	$115
Marketable securities and bank deposits	323	239	239	230	229
Royalty and technical assets	83	58	60	59	52
Customer financing	75	69	58	80	72
Other items	179	247	130	116	95
Total	$989	$884	$692	$614	$563

Exhibit 1-C Financial Condition ($ millions)

As of December 31	*1984*	*1983*
Assets		
Cash	$ 1,859	$ 1,828
Marketable securities	514	677
Current receivables	5,509	5,249
Inventories	3,670	3,158
Current assets	11,552	10,912
Property, plant and equipment—net	7,690	7,697
Investments	3,717	2,945
Other assets	1,771	1,734
Total assets	$24,730	$23,288
Liabilities and equity		
Short-term borrowings	$ 1,047	$ 1,016
Accounts payable	1,931	1,993
Progress collections and price adjustments accrued	2,403	2,551
Dividends payable	250	228
Taxes accrued	673	685
Other costs and expenses accrued	2,303	2,215
Current liabilities	8,607	8,688
Long-term borrowings	753	915
Other liabilities	2,668	2,247
Total liabilities	12,028	11,850
Minority interest in equity of consolidated affiliates	129	168
Common stock	579	579
Other capital	640	657
Retained earnings	11,667	10,317
Less common stock held in treasury	(313)	(283)
Total share owners' equity	12,573	11,270
Total liabilities and equity	$24,730	$23,288

...hibit 2-A GE's Organization Chart, September 1981



* Strategic Business Unit (Total = 38)
• Affiliate

GENERAL ELECTRIC COMPANY ORGANIZATION CHART

9/1/81

SHARE OWNERS

BOARD OF DIRECTORS

…RATE EXECUTIVE OFFICE

JOHN F. WELCH, JR.
…Board and Chief Executive Officer

…Officer

JOHN F. BURLINGAME
Vice Chairman of the Board and Executive Officer

Corporate Relations Staff
Frank P. Doyle
Senior Vice President

- Corporate Employee Relations Operation
- Corporate Government Relations Operation
- Corporate Health and Safety Operation
- Corporate Marketing Programs and Communications Operation
- Vice Presidents—Regional/Corporate Customer Relations
- Chief Executive Officer Communications
- Corporate Public Information

Corporate Productivity and Quality Staff
Robert B. Kurtz
Senior Vice President

- Production Studies
- Productivity Programs

Corporate Planning and Development Staff
Daniel J. Fink
Senior Vice President

- Corporate Development Staff
- Corporate Strategic Planning Staff
- Corporate Strategic Projects
- Economic Research and Forecasting Staff

Executive Manpower Staff
Theodore P. LeVino
Senior Vice President

- Corporate Executive Compensation Operation
- Corporate Executive Resources Operation
- Corporate Organization Planning Operation
- Executive Manpower Consulting

Industrial Products Sector
Louis V. Tomasetti
Executive Vice President and Sector Executive

- *Contractor Equipment Business Group
  - Apparatus Distribution Sales Division
  - Distribution Equipment Division
- *Motor Business Group
  - Component Motor Division
- *Transportation Systems Business Operations
  - Locomotive Products Division
  - Locomotive Marketing Division
- *General Electric Supply Company Business Division
- Industrial Products Customer and Industry Relations Operation

International Sector
Robert R. Frederick
Executive Vice President and Sector Executive

- International Trading Operations
- Europe and Africa Operations
  - Middle East/Africa Business Development Division
- * General Electrica Espanola, S.A.
- Latin American Operations
  - Latin American Business Development Division
  - Andean Countries Business Division
  - General Electric do Brasil S.A.
  - General Electric de Mexico, S.A.
- Far East Area Division
- Canadian General Electric Company Limited

Power Systems Sector
Herman R. Hill
Executive Vice President and Sector Executive

- *Turbine Business Group
  - Gas Turbine Division
  - Industrial and Marine Steam Turbine Division
  - Large Steam Turbine-Generator Division
- Construction and Engineering Services Group
  - C&ES Planning Integration Operation
  - *Installation and Service Engineering Business Division
  - *Apparatus Service Business Division
  - *oSADE/SADELMI Construction Operations
- *Nuclear Energy Business Operations
  - Nuclear Engineering Division
  - Nuclear Fuel and Services Division
  - Nuclear Power Systems Division
- *Large Transformer Business Division
- Power Delivery Division
  - *Distribution Transformer Business Department
  - *Meter Business Department
  - *Switchgear Business Department
  - *Power Systems Management Business Department
- Energy Systems and Technology Division
- Electric Utility Sales Division

oUtah International Inc.
Alexander M. Wilson
Chairman of the Board and Chief Executive Officer

- Australasia Division
- Mineral Exploration and Development Division
- Mining Division
- oLadd Petroleum Corporation

Exhibit 2-B GE's Organization Chart, 1984

EDV
Vice Chairman o

Charles V.
Corporate Exe
Vice Pre

OPERATING COMPONENTS

Consumer Products Sector
Paul W. Van Orden
Executive Vice President and Sector Executive

- Lighting Business Group
  - Lamp Components and Technical Products Division
  - Lamp Products Division
  - Lighting Systems Products Division
- Major Appliance Business Group
  - Major Appliance Production Division
  - Major Appliance Technology Division
  - Major Appliance Marketing, Sales and Service Operations
    - Major Appliance Marketing Division
    - Major Appliance Sales and Service Division
- Consumer Electronics Business Operations
- Mobile Communications Business Division

Corporate Marketing

Industrial Systems Sector
James A. Baker
Executive Vice President and Sector Executive

- Industrial Electronics Business Group
  - Factory Automation Products Division
- Motor Business Group
  - Motor Marketing Division
- Construction Equipment Business Operations
  - Construction Equipment Sales Division
- Transportation Systems Business Operations
  - Transportation Products Division
  - Transportation Marketing Division
- Semiconductor Business Division
- General Electric Supply Company Business Division

Aerospace Business Group
George B. Farnsworth
Senior Vice President and Group Executive

- Avionic and Electronic Systems Division
- Defense Systems Division
- Space Systems Division
- Ordnance Systems Division

Aircraft Engine Business Group
Brian H. Rowe
Senior Vice President and Group Executive

- Evendale Aircraft Engine Product Operations
  - Military Engine Projects Division
  - Airline Marketing Division
  - Marine & Industrial Engines and Service Division
  - Evendale Engine Projects Division
  - Evendale Production Division
- Lynn Aircraft Engine Product Operations
  - Lynn Engine Projects Division
  - Lynn Production Division

Medical Systems Business Group
Walter L. Robb
Senior Vice President and Group Executive

- Medical Systems Product Management Division
- Medical Systems Sales and Service Division

•Calma Comp
Daniel W. McGl
Presiden

CORPORATE COMPONENTS

Corporate Research and Development
Roland W. Schmitt
Senior Vice President

- Chemical Laboratories
- Electronics Laboratories
- Engineering Physics Laboratories
- Materials Laboratories
- R&D Applications Operation

Corporate Engineering and Manufacturing
Fred W. Garry
Vice President

- Industry Standards
- Production Resources Consulting
- Technical Resources Consulting

Corporate Purchasing
Bruce O. Roberts
Vice President

- Advanced Purchasing Systems
- Purchasing—assigned materials
- Real Estate and Construction Operation
- Transportation Operation

* Affiliate

SHARE OWNERS

BOARD OF DIRECTORS

)RPORATE EXECUTIVE OFFICE

JOHN F. WELCH, JR.
:n of the Board and Chief Executive Officer

:tive Officer

LAWRENCE A. BOSSIDY
Vice Chairman of the Board and Executive Officer

Michael D. Lockhart
Corporate Executive Office
Vice President

International Sector
John A. Urquhart
Executive Vice President and Sector Executive

- International Trading Operations-GETC
- Europe and Africa Operations
  - Middle East/Africa Business Development Division
- Andean Countries Business Division
- •General Electric do Brasil S.A.
- •General Electric de Mexico, S.A. de C.V.
- Asia Pacific Division
- •Canadian General Electric Company Limited

Power Systems Sector
Louis V. Tomasetti
Executive Vice President and Sector Executive

- Turbine Business Group
  - Gas Turbine Division
- Construction and Engineering Services Group
  - Domestic Apparatus and Engineering Services Division
  - International Construction and Engineering Services Division
    - •SADE/SADELMI Construction Operations
- Nuclear Energy Business Operations
  - Nuclear Technologies and Fuel Division
- Power Delivery Division
- Electric Utility Sales Division
- Industrial Sales Division

•General Electric Financial Services, Inc.
Robert C. Wright
President and Chief Executive Officer

- •General Electric Credit Corporation
  - Financing Operations
    - Commercial Financing Division
    - Transportation and Industrial Financing Division
    - Distribution Sales Financing Division
    - Real Estate Financial Services Division
- •Employers Reinsurance Corporation

Plastics Business Group
Glen H. Hiner
Senior Vice President and Group Executive

- Lexan Products Division
- Noryl Products Division
- Plastics Sales Division
- •General Electric Plastics B.V.

General Electric Information Services Company
Walter W. Williams
President

Senior
Sil

Corporate Information Systems
Edward J. Skiko
Vice President

- Computer Applications
- Computer Systems Planning and Integration
- Computing and Product Technology
- Corporate Telecommunications
- IS Professional and Management Development

Trust Investments Operation
Dale F. Frey
Vice President

- Equity Investments
- Corporate Financial Investments

eered Materials Group
Charles R. Carson
resident and Group Executive
Products Business Division

* Ladd Petroleum Corporation
John H. Moore
President

CORPORATE COMPONENTS

Corporate Finance Staff
Dennis D. Dammerman
Senior Vice President—Finance

- Corporate Accounting Operation
- Corporate Treasury Operation
- Corporate Audit Staff
- Corporate Financial Management
- Corporate Investor Communications

Corporate Business Development and Planning
Michael A. Carpenter
Vice President

- Business Development and Strategy
- Economic Research and Forecasting
- Merger and Acquisition Services
- *General Electric Venture Capital Corporation

Corporate Relations Staff
Frank P. Doyle
Senior Vice President

- Corporate Employee Relations Operation
- Corporate Environmental Programs
- Corporate Medical Operation
- Corporate Government Relations
- Corporate Public Relations
- Regional/Corporate Customer Relations

Corporate Legal Staff
Walter A. Schlotterbeck
Senior Vice President-General Counsel and Secretary

- Associate General Counsel
- Corporate Legal Operation
- Corporate Patent Operation
- Legal Organization and Staffing
- Legal Services

Executive Management Staff
Jack O. Peiffer
Senior Vice President

- Corporate Executive Compensation
- Corporate Executive Resources
- Corporate Organization Planning
- Executive Management Consulting

Appendix

Taking a Swing

Aaron. Ruth. Mays. Robinson. Killebrew. Mantle. The top six home run hitters in baseball history. Hall of Famers all.

But fame comes in many guises. For these baseball immortals, it comes not only in slugging records but also from being among the leaders in career strikeouts.

One reason, of course, is that the fiercer the swing a batter takes, the higher the risk of walking back to the dugout with his head down rather than circling the bases, doffing his cap, and collecting applause. The cautious hitters, the bunters, may not strike out as often, but their names and faces don't show up on bronze plaques with the same frequency as those who take the big swing.

What follows are stories about three big swings taken by GE entrepreneurs.[1] One missed. The others connected—and it looks like they have a good chance of clearing the fences. Their technologies and markets are totally unrelated, yet they share one thing: an almost countercultural view of the risk/reward equation.

If GE is to continue to put distance between itself and the bunters of the business world, it *must* take the big swing with increasing frequency. That may mean some strikeouts along the way. But the prospects of hitting a home run make the risks worthwhile.

Halarc

In 1979, General Electric decided to reinvent the light bulb.

A small team of engineers and planners assembled in the back shops of GE's Lamp Products Division to bring life to a bold decision—skip the traditional low-volume commercial market, and take a $10 light bulb directly to price-sensitive consumers.

The design was complex, the risks clear.

If it worked, it could revolutionize a market that had hardly budged in a century. But it didn't. In the end, the venture failed, but the team won.

The halide arc lamp—or Halarc as it was called—was one of the hottest ideas on the board of GE's ventures game since . . . well, since Edison first flipped the switch. Everyone knew that the odds on losing were high.

"This wasn't a case where everyone thought we had a sure thing," recalls Dr. Richard Kashnow, then product general manager for the Halarc Product Section. "The risk/reward equation all along was very clear. But we believed in Halarc and the value it offered consumers. We took a lot of pains to get across the point that careers wouldn't be on the line if it didn't work out."

The Halarc idea was to miniaturize a version of a highly sophisticated light source that offered three hard-to-get advantages: good color, high efficiency, compact size.

It could shine like a regular 150-watt bulb, last five times longer, and use only one-third the electricity. For consumers, the savings over the lifetime of the bulb were attractive—about $40 in typical markets, up to $75 in areas like New York City, where electricity costs are high.

Back in 1979, it seemed the timing couldn't be better—smack in the middle of the decade's second energy crisis, with consumers clamoring for energy-saving devices.

As in most ventures, the team struggled through months of design failures and breakthroughs. A miniature electronic power supply had to be designed so that the whole unit could be screwed into a regular incandescent socket.

The technology of the lamp design only permitted it to operate in base-down positions, such as in table lamps. A more versatile design, planned for the second phase of development, proved to be more difficult than anticipated. So the marketing plan was altered.

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1. Only one of the stories is reproduced here. The other two dealt with cogeneration and programmable controllers. Reproduced with permission from the *General Electric Monogram*, Spring 1984.

Appendix (continued)

Finally, after two years of technical and market-niche modifications, Halarc went into a 10-month marketing test study in two cities—Des Moines, where it sold for roughly $10, and Salt Lake City, where it carried an eye-popping price tag of about $15.

Consumers balked. While they liked the product, they didn't like the price tag.

Part of the problem was that the one-time frantic interest in energy efficiency and long-term value had dimmed. By 1981, in the heat of recession, consumers had shifted away from energy savings and demanded bargains. It was lights out for Halarc.

But that's only half the story. Halarc is now a living legend for GE's risk-takers. Because looking over the shoulder of the Halarc team was every other ventures group throughout the company, watching to see if General Electric was willing to make good on its promise to reward those who try as well as those who win.

"We wanted to make sure that all the people involved in Halarc—who had really done a good job and made a lot of progress—didn't get their careers disrupted because of the way if worked out in the marketplace," says Kashnow, now general manager of the Quartz and Chemical Products Department. "We took a lot of care not only to communicate that but to make sure that they had appropriate career opportunities when it was over."

The bargain held up. When the decision was made in the summer of 1983 to put Halarc on the back burner, the section held award parties, dinners, and ceremonies for the group.

Top management—from the CEO to the sector executive, group executive, and division manager—got the message through to those who devoted years of their careers to Halarc that their work was appreciated.

Additional attention was given to team members to make sure that appropriate job assignments were waiting for them. It was not hard. Since the team had attracted a lot of the best in the business, they were in demand.

"Only certain people are attracted to risk-taking," Kashnow explains. "We've got to preserve the kind of culture that allows people to take those risks."

Far from collecting dust on museum shelves, Halarc opened new frontiers in state-of-the-art technology for the industrial market, where buyers are more accustomed to high initial costs and life-cycle paybacks. And, as the technology matures, Halarc may find its way back into the consumer market at a lower price.

For risk managers and players, Halarc offered another reminder—to recognize risk up front, manage it properly, and not get caught off guard when the project does not work out.

Even though the big swing never connected, it left its mark.

It got the message through to people about the company's concern for individuals, about a culture that encourages people to try again, and about the commitment of management to share the risks.

Harvard Business School

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GENERAL MOTORS' ASIAN ALLIANCES

In 1966, the General Motors Corporation (GM) stated that "unified ownership for coordinated policy control of all of our operations throughout the world is essential for our effective performance as a worldwide corporation." Twenty years later, GM had created joint ventures and other cooperative arrangements with a number of firms both in the United States and around the world. Among Asian firms, these tie-ups linked GM with Isuzu, Toyota, Suzuki, and Nissan; with the Daewoo Group in Korea; with Hitachi, the Japanese electronics giant; with Fanuc, a leading Japanese robotics maker; and with many smaller Japanese firms.

Cooperative arrangements were a familiar practice for Japanese and Korean firms but not for GM; hence GM's efforts in Asia are open to many interpretations. They could be viewed as a series of ad hoc solutions to pressing needs, as an extension to Asia of GM's practice of securing a range of suppliers to reduce risk and gain leverage--or perhaps as an embryonic American version of the Japanese enterprise groups.

The formation of these relationships took place against a backdrop of historic change, turbulence, and weakening performance at GM. In 1987, its market share in the United States had fallen to 36.5% and its car business earned less than $100 million (see <u>Exhibits 1</u> and <u>2</u>). GM was nearing the end of a multiyear, $40 billion investment in high technology and automation that had included the acquisitions of Electronic Data Systems (EDS) and Hughes Aircraft. Under Chairman Roger Smith, GM had also reorganized its car business into two large groups, one for smaller cars and one for larger ones, and had announced the creation of a new subsidiary, the Saturn Corporation, that would bring together state-of-the-art technology, innovative marketing and supplier arrangements, and a ground-breaking participatory relationship with the United Auto Workers (UAW).

This case describes the major relationships or groups of relationships that GM set up with Asian firms: 1) the Toyota joint venture, 2) partnerships with small Asian car makers (Isuzu, Suzuki, and Daewoo), 3) the Fanuc joint venture, and 4) alliances with companies that make parts and components.

Associate Professor Joseph L. Badaracco, Jr. prepared this case with the research assistance of Naomi Hasegwa as the basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation.

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Toyota

In 1983, GM and Toyota announced that they would create a 50-50 joint venture in California called New United Motor Manufacturing Incorporated (NUMMI), which soon became the most publicized and closely watched strategic alliance in recent U.S. history. Chrysler Chairman Lee Iacocca said, "It's a recipe for breaking the industry by 1990" and that Ford and Chrysler would again "be looking at bankruptcy or bailouts." The Federal Trade Commission (FTC), in response to such concerns, mounted one of the most intensive efforts in its history before finally approving NUMMI by a three-to-two vote.

Toyota contributed $100 million in cash to NUMMI and GM contributed the same, including its plant in Fremont, California. A state-of-the-art operation when it opened in 1963, this facility had employed 7,000 workers in the late 1970s, but GM closed it in a cost-control and consolidation effort in the early 1980s. By then poor labor-management relations, high absenteeism, and alcohol and drug-related problems had handicapped its operations.

NUMMI would have its own board of directors, appointed in equal number by its parent firms, with Toyota choosing its president, chief executive officer, and other top officers. GM could assign no more than 16 executives to tours of duty at the plant at any one time. The plant's 2,100 employees would be members of the UAW.

NUMMI would manufacture approximately 200,000 cars a year. Its initial product was to be the Chevrolet Nova, a front-wheel-drive version of the Sprinter, (a compact car Toyota had already been making and selling in Japan) to sell for about $7,500. NUMMI would be a stamping and assembly operation; Toyota would make the major components, including the drive train, in Japan; and other parts and components would originate in the United States. Under the FTC consent decree, the joint venture could not run beyond 1996.

The Toyota Group. Toyota is not simply a company but rather a confederation of firms more properly called the Toyota Group. As such, it is a common form of Japanese industrial organization known as enterprise groups, or keiretsu which control roughly a third of Japan's industrial assets. Their distinguishing trait is the links among member firms, described by one economist as "a thick and complex skein of relations matched in no other industrial country."

Two sorts of keiretsu exist in contemporary Japan. One is a successor to the zaibatsu, the giant conglomerates that dominated the Japanese industrial landscape for most of the first half of this century. Mitsui, Mitsubishi, and Sumitomo were among the most famous and powerful zaibatsu. Their member firms included banks, insurance companies, light and heavy industrial firms, and overseas trading companies. The U.S. Occupation following World War II broke up the zaibatsu to disperse their economic and political power, but after the Occupation many of the original groups reemerged, though ties among member firms are now looser and more informal.

Toyota--along with Nissan, Hitachi, and other large Japanese manufacturing firms--represent the second kind of keiretsu. These manufacturers stand, in effect, at the apex of a hierarchy of firms. The dominant firm concentrates on assembly work and marketing; the next tier consists of primary suppliers. Toyota and Nissan make engine parts, brake parts, meters, chassis, and bodies; beneath them are secondary subcontractors that supply the primary suppliers. These rely, in turn, on a bottom tier of tertiary subcontractors. (As a result of its group affiliations, Toyota's level of vertical integration was approximately 30%; GM's was roughly 70%.) The Toyota Group includes thousands of tertiary suppliers, most of which are very small, who produce the simple "parts of parts" that secondary contractors and then primary suppliers use to make their own products. The firms in each tier remain legally separate and are often small, owner-managed businesses. Their relationship with their parent company is semipermanent and although it is unusual for such a relationship to be terminated or for one supplier to be replaced with another, it happens occasionally.

All tiers of this pyramid are connected through intricate arrangements, including minority equity ownership (Toyota owns 10% to 70% of many of its affiliated firms); interlocking directorates; and financial aid in the form of trade credits, loans, or credit guarantees given by the parent. The presidents of affiliated companies meet regularly. The peak firm may also lend personnel and offer technological guidance and exchanges. Above all, each tier in the hierarchy purchases a high fraction of its suppliers' outputs.

Some of these relationships originated during the 1950s when automotive firms and other manufacturers lacked the funds to invest in component operations. Moreover, wages and benefits were lower then among subcontractors, and few of their employees were assured lifetime jobs. Other groups had formed decades--even centuries--earlier, and their complex linkages did not wither away as these manufacturers became powerful and prosperous; relations within groups were refined, not replaced.

The Toyota Production System. Toyota had developed its keiretsu arrangements to a high degree of refinement. Its manufacturing took place almost entirely in Toyota City, a huge, intricately integrated complex of assembly plants and suppliers three hours away from Tokyo. Its kanban, or "just-in-time system," is another link among firms in the Toyota Group. and, according to one Toyota executive, it is "the essence of Toyota and its relationships." A kanban is simply a small paper or metal tag attached to a container of auto parts or components, describing its destination, indicating what time it should arrive, and so forth. The phrase "just-in-time" refers to the notion that the component should arrive at the station where it is needed precisely when it is needed. Ideally, a firm's inventory consists only of a single unit of each part held until just the moment before it is used. In practice, the kanban system relies on very small inventory lots and resembles the daily-delivery system used to restock supermarket shelves.

The kanban inventory system reveals bottlenecks, lessens the need for managers and foremen, and permits a plant to shift product lines more

quickly. Toyota executives also believe it gives members of the group a common interest in finding and anticipating problems, and thus serves in focusing them on their joint concern--the manufacture of outstanding products. It is not, they stress, merely a system for highlighting problems or for figuring out which individuals should be held accountable for them. Though its mechanics are simple, the system's role within the Toyota Group is described in subtle, almost elusive ways: "a relationship from a spiritual point of view" and "intensely competitive but not unstable." Toyota's president called it an instrument of "harmony and communication."

As Toyota concentrated on and refined its production system during the 1960s and 1970s, the company grew more powerful, more ambitious, and yet perhaps more cautious. By 1986, Toyota's car and truck exports to the United States exceeded $10 billion, accounting for 25% of its sales and an even larger fraction of its profits. By 1987, its market share in Japan exceeded 50%. (Nissan, the next largest domestic firm, which had earlier been investing heavily in computers and robots, had less than 20% of the Japanese market.) Until the appreciation of the yen cut deeply into its operating profits, Toyota had become so profitable that its Japanese nickname was "the Toyota Bank," a reference to the $6 billion in liquid assets it had accumulated.

During the 1980s, Toyota's worldwide market share grew to 8%, making it the third largest auto firm (behind Ford and GM) in the world. Some speculated that the company's ambition for the 21st century was to overtake GM as the world's largest car producer. But Toyota generally let competitors make the first moves with new products. Nissan moved first into the sports car market with its Z series and Honda developed vehicles that straddled the sports and family markets. (Later, Honda led the way into the high-priced market with its Acura line.) And, until it created NUMMI, Toyota, alone among Japan's three biggest car manufacturers, did not have an assembly plant in the United States.

<u>NUMMI.</u> NUMMI followed many of Toyota's established practices. Its workers, like Toyota's in Japan, were chosen only after intensive screening. The plant has only four job classifications in contrast to the hundred that existed previously at the Fremont plant, and workers have incentives (under a Pay for Learning program) to be trained for many jobs, not just one. Both Toyota and GM have made strong commitments to job security. Decision making has been delegated downward to small worker-led teams, and many of the first workers at the NUMMI plant visited Toyota City for extended training in the Toyota system. Toyota also implemented a just-in-time system and set extremely high quality-control standards for NUMMI suppliers. Though that caused antagonism among some U.S. suppliers, those who succeeded in meeting Toyota standards often marketed themselves as "good enough to supply Toyota."

By the end of 1987, GM was trying to apply the lessons learned from NUMMI throughout its manufacturing system. It had created a Technical Liaison Office in California to document what it was learning about the NUMMI production system. GM plants in New Jersey and Delaware, which made the new Chevy Corsicas and Berretas, used a team approach derived from

NUMMI, and GM based many of its plans for its new Saturn plant on the NUMMI experience. More than 3,000 GM employees were given one-day tours of the NUMMI facility. Finally, GM defended its 1987 contract with the UAW by arguing that its job security program and limits on plant closings were further investments in a genuinely cooperative relationship with the union. Under that contract, GM workers and managers would set up committees in every plant that would be given six months to report ways to improve productivity and quality.

Toyota had gained enough confidence from NUMMI to proceed with a $300 million auto plant in Canada and an $800 million auto plant in Kentucky; the latter would open in 1989 and produce about 200,000 Camrys each year.

The results at the NUMMI plant were mixed. GM's quality audits gave the plant extremely high ratings. Toyota was also impressed by the plant's quality and decided in 1987 to make 15,000 Corolla FX-16s at Fremont and sell them through its own dealers. Absenteeism had dropped to about 2%, compared with 22% during the old days at Fremont. Disappointment arose, however, from weak Nova sales and in late 1987, NUMMI's production was cut from 600 to 400 cars per day. Factors contributing to this reduction included the marketing by Chevrolet of several cars such as the Suzuki and Isuzu vehicles and marketing decisions to do with the Nova, particularly its name. One auto analyst commented bluntly, "The previous Novas were not great cars." Also, Toyota had permitted GM to sell only a four-door vehicle, keeping the two-door hatchback for itself. The latter car, the Corolla FX, moved successfully through Toyota dealerships without the financial incentives amounting to several hundred dollars that GM had offered with the Nova during 1987.

Finally, press reports indicated clouds over the horizon at Fremont. Business Month wrote in June 1987: "GM and Toyota say the plant's a success, but it's no workers' paradise." The early excitement had ebbed, it reported, and workers were becoming worn out by the fast pace of operations (NUMMI used only a third as many workers as did comparable United States plants). Some had organized a dissident group called "The People's Movement" to oust the current union leadership in the 1988 election. GM and UAW officials dismissed some of these criticisms as union politics and stressed that NUMMI was trying to change adversarial attitudes embedded in GM labor relations for decades.

Other Asian Car Makers

Isuzu. Isuzu's affiliation with GM began in 1971, when GM agreed to pay $56 million for a 34.2% interest in Isuzu. Under the agreement, that level of ownership would remain for five years; if for some reason GM did acquire more shares during that period, it could not vote them without Isuzu's permission. Four GM executives became members of Isuzu's board, but the agreement kept the posts of president and chairman in Isuzu's control. GM would assist Isuzu in designing, developing, and manufacturing cars; it would also distribute Isuzu products through its global network.

At the time of the agreement, Isuzu was encountering difficulties. In 1970, after experiencing problems in developing new trucks, its main product, Isuzu saw its market share fall from 36% to 20%; its passenger car sales were also low because of its weak sales network.

Isuzu had begun making cars in 1953, when it started assembling "knock-down" kits from a British supplier. This effort gave the company confidence, and in 1961 it designed and produced a diesel-powered car on its own. The car succeeded at first, but sales fell when nondiesel fuels became more abundant and when competitors' cars proved to be more comfortable and less noisy (see Exhibit 3). During the next several years, Isuzu attempted tie-ups with Fuji Heavy Industries, Mitsubishi, and Nissan. None succeeded. After the liaison with Nissan fell through, Isuzu reached the agreement with GM that led to their partnership.

The GM deal raised Isuzu's capital from 25 to 38 billion yen, enabling Isuzu to build a parts factory. In 1972, Chevrolet began selling Isuzu's 1-ton truck in the United States, marketing it as the Chevy Luv. Chevrolet quickly sold 100,000 of the vehicles, and by 1973, Isuzu had almost doubled its exports.

Isuzu's difficulties continued, however, and the company lost 8.7 billion yen in 1975. In 1976, Isuzu Finance Company, Isuzu's largest subsidiary, and General Motors Acceptance Corporation (GMAC) signed an affiliation agreement. GMAC purchased 51% of Isuzu Finance's stock, doubling its capital to 6 trillion yen.

Isuzu then set up several production and sales bases overseas: GM Pilipinas, a joint venture with GM in the Philippines to make Isuzu cars and components; a joint venture with Turkish partners in 1980 to manufacture and sell trucks; and a joint venture in Tunisia with GM and local partners in 1983 to assemble and sell Isuzu trucks and Opel cars. Also in 1983, Mesin Isuzu Indonesia (25% Isuzu ownership, 10% GM and 8% C. Itoh) was established with three Indonesian automobile makers to make diesel engines. Later that year, plans for GM Egypt SAE (20% Isuzu and 31% GM) were announced to manufacture pick-ups and trucks in Cairo. Convesco Vehicle Sales, (40% Isuzu and 60% GM) was also begun in Germany to market commercial vehicles in Europe and Isuzu Motors Overseas Distribution Corporation (Isuzu 51%, GM 49%) was formed to sell Isuzu vehicles and parts through independent distributors (mostly also distributors of GM vehicles), in some 130 countries.

During the same period, Isuzu continued to build R&D and supply arrangements with GM. In 1981, Isuzu signed a seven-year parts supply contract with GM and another agreement to supply components to five GM subsidiaries, including Opel, in West Germany. Isuzu already had ties with Opel: in 1972, it had agreed with Opel and GM to purchase small-car technology.

In 1984, Isuzu began shipping a new vehicle, the Spectrum to Chevrolet, which had invested $200 million in its development and sold it through its dealers. GM could get only 17,000 Spectrums in 1984, the maximum allowed under the voluntary restraints that the Japanese government

had imposed on its auto makers in 1981. Two years later, when Isuzu was permitted to ship 120,000 to the United States, 90% were sold through Chevrolet, and the rest through Isuzu's own dealers. GM's purchases represented roughly 40% of Isuzu's total car and truck production.

In 1986, Isuzu and GM's Electronic Data Services unit (EDS) signed a five-year contract for upgrading Isuzu's telecommunications and engineering data processing capabilities in Japan and other countries: Isuzu would gain access to the worldwide telecommunications network EDS was creating for GM; EDS would also integrate Isuzu's CAD/CAM operations and engineering software. Later, EDS planned to study Isuzu's factory automation and flexible manufacturing systems for possible upgrading.

Finally, in February 1987, Isuzu formed a 10-year agreement to supply engines to Lotus, a wholly owned subsidiary of GM. In exchange, Isuzu would receive technology from Lotus--possibly an advanced suspension system--to use in a sports car called the Impulse, which Isuzu exported to Europe and the United States as a specialty car. Isuzu was also studying a proposal to sell Lotus cars in Japan. Later that year, GM and Isuzu created a 60-40 joint venture that would take over GM's unprofitable van operation in the U.K.

Daewoo. One of four large Korean conglomerate groups, Daewoo had sales of $8.6 billion and profits of about $50 million in 1985. Its businesses include trade, construction, shipbuilding, industrial machinery, motor vehicles, electronics, telecommunications, textiles, aircraft parts, personal computers, and financial services.

GM's links with Daewoo began in 1972, when GM purchased a 50% share in Shinjin Industrial, a small Korean automobile maker, and established a joint venture with Shinjin called GM-Korea. Shinjin later pledged its shares to the Korea Development Bank, and in 1978 the Daewoo Group acquired these shares. Five years later, the company was rechristened Daewoo Motor Co.

GM and Daewoo announced in 1984 that they would produce small cars for sale in Korea and abroad, which represented a $427 million investment with each firm contributing $100 million and Korean banks and Japanese equipment leasing firms providing the remainder. The funds paid for new stamping, engine, and assembly plants with an annual capacity of 167,000 vehicles. This would raise Daewoo's passenger car capacity from 66,000 to 233,000 and these 80,000 to 100,000 cars would be marketed at about $5,000 in the United States as the Pontiac LeMans.

The LeMans is based on the Opel Kadett, chosen "European Car of the Year" in 1985. Plans for its production, evaluated by an international team of engineers from Daewoo, GM, and Adam Opel included state-of-the-art technology, such as anticorrosive paint vats and automated spray booths for painting. The influence of Opel engineers was evident in a number of the production processes: an assembly line that tilted sideways for easier installation of brake, fuel, and exhaust parts and a one-piece assembly of the driver instrument panel, steering column, and wheel were innovations not found in American plants. The new plant also incorporated robots and

other automated equipment to boost quality, including 18 welding robots manufactured by GM Fanuc and Italian welding robots that positioned body panels precisely during framing operations. Opel provided an engine suited to Korean driving conditions, and Pontiac and Opel adapted it for U.S. emissions requirements.

Because obtaining quality parts was a problem in Korea, Daewoo Precision Industries and GM's Delco Remy division formed Daewoo Automotive Components in 1984 to manufacture cranking motors, alternators, ignition distributors, and ignition coils at a new plant in Korea. In 1985, DHMS Industries, a joint venture representing a $100 million initial investment, was formed by Daewoo Precision Industries and three GM divisions (Delco-Moraine, Harrison Radiator, and Saginaw Steering) with Daewoo and GM providing $18 million each in equity. The new firm would make steering columns and gears, front axles, brakes, radiators, heaters, and air conditioner components.

Later in 1985, a Daewoo Group subsidiary, Korea Steel Chemical Co. and GM's Fisher Guide division created Koram Plastics with a total initial investment of $20.5 million to manufacture polyurethane bumpers, using an advanced injection molding system.

In July 1986, Daewoo introduced the LeMans to the Korean market. Orders for the LeMans ran about 7,000 a month in contrast to 4,000 a month for a comparable Hyundai, despite the LeMans's higher price. By the end of the year, Hyundai's share of the Korean market had been cut from 80% to 60%. Daewoo Motors, intending to increase production to 278,000 units in 1988, expanded its parts production for GM, and Daewoo's chairman stated that "by 1988, exports of parts will equal the value of cars--$1 billion annually."

Suzuki. Suzuki's ties with GM began in 1981, when the Japanese firm announced that it would sell a 5.3% interest to GM for $35 million. At the same time, Suzuki and Isuzu swapped roughly 3% of their shares with each other.

At the time of the GM deal, Suzuki had about 5% of the Japanese car market and was a leader among domestic motorcycle producers. In minicars, Suzuki ranked first in Japan (see Exhibit 4); its motor vehicles ranged from 500 to 1,000 cc; the 800 to 1,000-cc vehicles were exported. It exported fewer cars than its Japanese competitors because most were smaller than the minimum size allowable in Western markets. Suzuki, with GM's assistance, would design and produce a car greater than 550 cc that would satisfy United States emission and safety standards.

In 1983, Suzuki introduced the 1-liter Cultus to the Japanese market. Jointly developed with GM, the car was tailored to meet the requirements of GM's Chevrolet division. Although one automobile magazine concluded that "in terms of both technology and production costs, the new Cultus set standards comfortably ahead of anything which GM was capable of achieving," the car got a lukewarm reception in the domestic Japanese market. In 1984, Chevrolet began selling the Cultus in the United States

as the Sprint and sold 60,000 in a fast-growing and highly competitive market.

Suzuki and Isuzu began pooling their distribution systems in 1985. Suzuki sold Isuzu cars and supplied Isuzu with minivans; Isuzu sold an Isuzu-badged version of the Suzuki Cultus 1-liter station wagon and planned to add other Cultus models. Japanese analysts speculated that joint manufacturing projects would follow these joint marketing efforts.

In 1986, Suzuki and GM announced that they would build a plant in Ontario, Canada, to assemble the Suzuki Cultus (Chevy Sprint) and the Suzuki Samurai at a rate of 120,000 and 80,000 respectively per year. The 50-50 joint venture would begin production in 1989, and more than 60% of its parts would be procured locally. GM would receive 80% of the output and planned to export part of its share to the United States.

Nissan. Like Toyota, Nissan, the world's fourth largest auto maker, is an industrial group. Its share of Japanese auto production fell from 30% in 1975 to 20% in 1985, total production fell every year between 1980 and 1984, and profits fell from 96 billion yen in 1983 to 65 billion yen in 1986.

In 1984, GM's Holden's subsidiary in Australia began supplying panels to Nissan Australia for production of the Pulsar. Nissan then supplied Pulsars to Holden's, which sold these vehicles as the Astra. The next year, Nissan began supplying transmissions and jointly developed engines to Holden's. In 1986, after it realized the Australian government would not change its plan to consolidate car makers in Australia from five to three, Nissan expanded its relation with Holden's, and in July, revealed that it would purchase 1.6- and 2-liter engines from GM Holden's.

In 1986, Nissan licensed the Daewoo Motor Company to produce the Vannette in Korea. Beginning in 1987, Daewoo would produce 30,000 vans a year to be sold first in Korea, but Daewoo expected to expand its output later and sell the vans in the United States through GM's sales network.

Fanuc

GMFanuc Robotics Corporation (GMF) was created in 1982 by GM and Fanuc, the Japanese controls and robotics company, with an investment of $5 million each. Its charter was to design, market, service, and develop factory automation robots. Technology would flow to and from GMF's parents, without royalties or licenses. GMF, whose headquarters and manufacturing facilities would be in Michigan, would have the exclusive right to sell robots made in Japan by Fanuc throughout North and South America, Australia, and New Zealand.

GMF grew explosively during its first five years. Its 1985 sales were more than triple those of its nearest competitor, Cincinnati Milacron's robotics division. Earning roughly $10 million on sales of $185 million in 1986, it claimed to be the number one robotics company in the world, with expected sales of $1 billion by 1990. Its robots, which cost

from $12,000 to $150,000 each, painted, welded, assembled, sealed, and loaded, and they also unloaded heavy or awkward cargoes. GMF expected to move far beyond simple "duck-drinking water" robots that repetitively performed the same simple task at the same spot on the same product. Future robots would have sensory functions and use television cameras and laser beams or extend sensitive probes to locate objects, reducing the need for manufacturers to develop ways of aligning objects for robot processing. GMF held talks with machine vision companies in which GM had made equity investments, even though two of them competed directly with GMF on vision systems, and GM did joint research on robots with Comau in Italy and had plans to do so with Hitachi. Ultimately, GMF planned to become the world's largest seller of vision systems.

GMF built its record of achievement in an intensely competitive industry; about 70 firms competed in the $600 million U.S. robotics market. Some were giants, such as Hitachi and Matsushita, General Electric, IBM, and ASEA but most were much smaller firms created in the late 1970s as a result of buoyant expectations in the field and abundant venture capital. Few firms were profitable. Margins evaporated because of price cutting and the high costs of customizing applications software to customers' needs. And the steep recession in the early 1980s forced many American firms to join Japanese robot builders--IBM with Sankyo Seiki, Westinghouse with Mitsubishi Electric, and Bendix with Yasakawa Electric--making competition even fiercer.

GM executives gave several reasons for joining forces with Fanuc. First, as the largest U.S. user of robots, GM bought a third of those sold in the United States, and expected to have about 14,000 by 1990. Along with tens of thousands of computers and computerized numerical control units (NCs), they formed the core of GM's high-technology manufacturing strategy. GM's aim was to make the company into a "21st century" firm. EDS, Hughes Aircraft, and the new Saturn subsidiary were also part of this effort. Second, GM was dissatisfied with some of its robotics vendors. Third, GM had developed some of its own robotics products and expertise and wanted to find a way to sell them. Fourth, GM was concerned that it might lose some of its robotics personnel and technology to other robotic companies.

Though the joint venture was begun within three months after initial contact, GM had carefully examined eight or ten potential partners and negotiated with two of them before settling on Fanuc, which had made a strong impression with its drive, aggressiveness, entrepreneurial management, and enthusiasm for joining forces with GM. This pace of decision making was almost unheard of at GM, but was quite natural for Fanuc, where Dr. Sieuemon Inaba, the chief executive, had installed in the product development lab a clock that ran at ten times normal speed.

<u>Fanuc's History.</u> In 1955, Fujitsu, the Japanese electronics and computer company, had placed Inaba in charge of a team of 500 engineers whose mission was to develop a factory automation business. Fujitsu spun off Fanuc in 1972, while retaining about 40% of its shares. Fanuc was Inaba's personal handiwork. Under him, it became the world's leader in computerized numerical controls or NCs, electronic boxes that control the

movements of machine tools such as lathes and milling machines. Widely recognized as the world's low-cost and quality leader, by 1980 it held 75% of the Japanese market and 50% of the world market for NC devices. Its operating profits were so high that potential investors were placed on a waiting list.

Fanuc's prowess in factory automation was demonstrated by the plant it opened in 1981. In its first year, this facility produced more than 100 robots and NCs a month with only 100 employees, one-fifth the work force of comparable firms. By 1986, Fanuc expected to quadruple the plant's output while only doubling its employment. The plant would run 24 hours a day, with NCs and robots producing NCs and robots.

Fanuc was an ultra-workaholic company, with 14-hour workdays ordinary for managers and researchers. Many lived in company dormitories and commuted home to see their families only on weekends. Managers earned as much as 50% more than their counterparts in Japan, and engineers as much as 30% more. Inaba, a reclusive man with a reputation for blunt, sometimes dictatorial behavior, had been compared with Ian Fleming's Dr. No. Inaba ran Fanuc with military precision.

When Fanuc joined with GM, it was seeking to build its robotics business. In 1980, NC devices and systems accounted for about 90% of the firm's sales; robots, only about 3%. Inaba wanted to boost robot revenues to 15% of Fanuc's business within three years. NCs resembled the hardware used to control robots; therefore, Fanuc's high-volume NC output would support much larger R&D spending than that of its competitors. Three factors appeared likely to impede Fanuc's drive into robotics: the Japanese economy's slowdown in the early 1980s; competition of about 200 Japanese firms in the robot industry; and also, Inaba believed, Japanese robot technology. In 1983, he said:

> I would like to stress that Japanese robot-making technology is not necessarily at the world's topmost levels. It is true that the Japanese makers have an overwhelming edge over Western counterparts in terms of commercialization and mass production, but we've lagged behind in basic research. U.S. and European firms keep ahead of us in the field of high-efficiency robots, such as the next generation intelligent robot with visual functions, moving robots capable of walking around factories and offices on their own feet, and more sophisticated robots connected with CAD/CAM systems. Though Japan boasts itself as being a "robot kingdom" possessing more than 70% of all the robots in the world, they are mostly manual manipulator types and other low-grade ones handled by men with remote control machines.

GM was not Fanuc's first overseas partner. During the early 1970s, Siemens, the German electronics giant, marketed and distributed Fanuc's NC devices throughout the world and owned 5% of Fanuc's shares. By the early 1980s, however, Siemens' ownership had fallen to 1%, and Fanuc had built its own European marketing network, becoming Siemens' competitor. In 1982, Fanuc agreed with Korea's Kolon group to set up a joint robot-

making company in Korea. During the 1970s, Fanuc had also licensed the manufacture of controls and motors to the Bulgarians and helped them build a production plant in Sophia. Since then Bulgaria had become the Eastern bloc's major supplier of machine tools for both civilian and military production. This Fanuc linkup led to controversy in the mid-1980s when an executive of the United States National Machine Tool Builders Association returned from the Soviet Union and said he had seen advanced Fanuc controls used in Soviet machine tool plants. Inaba's response was that Fanuc adhered "faithfully" to the Ministry of International Trade and Industry (MITI) export controls.

GMF's Operations. GMF's president and CEO was Eric Mittelstadt, a career GM manager. Mittelstadt said that GM and Fanuc interfered little with GMF's day-to-day operations, commenting that "both parents felt the company should manage itself and live or die on the basis of the robotics industry, and I took the job on that basis." Mittelstadt reported to a board of directors consisting of himself, the GMF executive vice president, and four others, two from Fanuc and two from GM. The board met twice a year, with a very few additional, informal meetings involving board members. GMF's executive vice president, responsible for coordinating product development, was a former Fanuc executive. Aside from him, however, only two or three of GMF's employees were Japanese.

Supplier-Vendor Relations. GMF's working relationships with its parents fell into two broad categories--the first, a supplier-vendor one. Fanuc built all of GMF's robots in Japan, except for robotic painting systems that GMF manufactured in Michigan. During 1985, devices imported from Fanuc equaled roughly 25% of GMF's sales. The paint robot, and associated hardware and software systems, which Mittelstadt described as "perhaps the most far-reaching advance in this technology," accounted for half of GMF's 1985 sales. The remaining sales was value-added to the Fanuc-supplied robots, primarily application systems work.

GMF also had supplier-vendor relationships with its customers. In 1985, GM accounted for 85% of GMF's sales in dollars and 70% in units, though GMF had tried to reduce its dependence on the automobile industry and on GM. Some of GMF's remaining sales were to other automobile companies, including Ford, Chrysler, BMW, Daimler-Benz, and Volkswagen, but most were to a wide range of nonautomatic companies. More than 75% of GMF's customers were outside the automobile industry, but they accounted for only 15% to 20% of its sales.

Integrating robotics with other larger computer systems made GMF's relations with its customers complex. Robotics firms found that most of their work was costly systems design (writing software and fitting robots into existing production lines), not simply making and selling "naked robots" or machines without customized applications engineering. Said an industry executive, "Implementing robotics is not like plugging in your coffee maker." An industry rule of thumb was that the cost of a robot was only 30% of total installation costs. Moreover, the main goal of many robotics installations was not to eliminate direct labor costs. For many U.S. manufactured goods, the direct labor content was below 15% and sometimes as low as 5%. Hence, robotics and computer-integrated

manufacturing created benefits mainly from automating the flow of information through a factory and reducing the costs (ranging as high as 50%) attributed to indirect labor, middle management, quality control, and other overhead.

Product Development. GMF's product development efforts were coordinated by meetings held four times a year and involving senior executives from both GMF and Fanuc. According to Mittelstadt, GMF spent "much more than our nearest competitor and possibly more than any of our worldwide competitors on R&D." Development projects were conducted by teams consisting of engineers from Fanuc, GMF, and sometimes GM, with engineers from both parents involved because GMF had access to robotics technology from both parents. Some projects concentrated on hardware, aiming at developing more economical and more specialized units; others on software, developing programming and communications languages. Perhaps the most extensive effort at GMF was the development of Karel, (named for Czech playwright Karel Kapek, who coined the term "robot," the Czech word for "serf") a programming language. It linked GMF robots, vision systems, and other devices to both GMF and non-GMF products. Several Japanese engineers spent two years at GMF helping to develop the language so that Fanuc's robots could use it. Karel gained wide acceptance in the robotics industry and could become the industry-standard language.

In August 1986, GMF sharply cut its revenue forecast for the next year and announced it would reduce its work force by nearly a third. GM had cancelled orders totaling nearly $90 million, or over a third of GMF's anticipated revenue for 1986, and there were capital constraints and frustration with some high-technology and automation efforts. GM's decision reverberated throughout the entire robotics industry. Estimates of total industry sales fell about one third to roughly $400 million. Major U.S. companies, such as Cincinnati Milacron and Unimation, which had already lost some of their GM business to GMF, anticipated bleak years. GMF expected its sales to be down substantially, and Mittelstadt said, "We will do well to break even this year."

Fanuc agreed to the cut in GMF's work force, but press reports asserted that Inaba was frustrated with the company. Business Week said Inaba had complained that although GMF bought 75% of his robots, it caused 90% of his headaches; at the time, Fanuc's profits for 1986 were estimated to have fallen by 35%. The same article asserted that there was frequent bickering inside GMF about the lack of stock options and GMF's total reliance on Fanuc for robot components. These speculations were denied by both Dr. Inaka and Mr. Mittelstadt.

Events in 1986. Fanuc and General Electric announced in June 1986 that they would create a $200 million joint venture called GE-Fanuc Automation (GEF). Fortune described GE's willingness to join forces with Fanuc as a "surrender," as GE had been Fanuc's main competitor in NCs. The previous year, however, GE had lost at least $200 million in its effort to become an "automation supermarket." Under the joint venture, GE would stop making its own NC units and instead assemble Fanuc devices at a plant in Virginia. The venture would concentrate on control systems for automated production lines. GE executives expected the effort to earn a first-year

profit of $250 million on worldwide sales. Denying capitulation to Fanuc, they asserted the venture was "a very natural marriage that is going to make one of the most competitive worldwide industries enterprises in the field."

The agreement would secure access for Fanuc to GE customers and personnel in engineering, service, and marketing. Fanuc also would have access to new products and technologies, such as programmable logic controllers and factory floor computers that GE had adapted after purchase from IBM and Digital Equipment. Cooperation between GEF and GMF was also expected. GEF would concentrate on NC products and systems, and GMF would concentrate on robotic products and systems, with the two cooperating on systems involving both areas. Finally, these arrangements--with both GMF and GEF--let Fanuc concentrate its efforts in NC and robotics hardware. The less profitable, much more difficult activity of customizing software would be done in conjunction with Fanuc's partners who would be closer to the customer requiring it.

Parts and Components Makers

An executive of GM's Delco Electronics division in the late 1970s realized that the U.S. industry would soon face serious competition from Japan on the price, quality, and reliability of components. As a result, Delco made the first foray into Japan. By the mid-1980s, GM's total purchases had risen rapidly from a level of roughly $100 million in 1980. Even with the rising yen, GM continued to expand its purchases and open relationships with leading Japanese parts suppliers. Estimates placed GM's 1986 parts purchases--most made by Delco Electronics--at $350 million, an increase of 80% from 1985 and an amount not including GM's purchases from Isuzu and Suzuki or its transactions with Fanuc.

Hitachi. GM and Hitachi, the Japanese counterpart of GE in size and product range, first joined forces in 1982 when GM Delco Electronics announced that they would begin joint development of microcomputerized control systems for cars. An industrial group that makes electric appliances, industrial machinery and power generation equipment, Hitachi, from the late 1970s, had expanded its auto parts production, an area it expects to grow rapidly with the incorporation of electronics. Hitachi already had similar projects with Isuzu and Suzuki. Later in the year, GM and Hitachi announced that they would begin joint development of robots for GM's plants: Hitachi would provide robot production technology and perhaps robots from Japan; GM would provide software.

In 1986, Hitachi and GM agreed to start cooperative development and production in five areas: car parts, computers, semiconductors and other electronic parts, optical fibers, magnetic materials, other new products, and factory automation. The two firms set up joint project teams to investigate each area, with their first focus on car parts. Both firms would develop technology for car electronics and Hitachi would commercialize. Later, the two companies would turn to technology for computers and factory automation. At the same time, GM announced a long-term agreement to spend roughly $60 million a year buying electronic control systems for car engines from Hitachi's new plant in Kentucky.

Nihon Radiator. A member of the Nissan group, Nihon Radiator is one of Nissan's three major parts producers, and Nissan owns 34.7% of its shares. It earned profits of $20 million on its 1986 sales of $1 billion.

In 1986, Nihon Radiator and GM announced plans for Calsonic Harrison, a joint venture to produce next-generation (V5) compressors for air conditioners originally developed by GM's Harrison Radiator division. Calsonic would build a $60 million plant in Japan; production would start in 1987 and increase to 1 million units a year by 1990. Most of the plant's output would be exported to the United States. Nihon Radiator would gain access to GM's V5 compressor technology, considered to be the most advanced of its kind.

Atsugi. Atsugi Motor Parts, along with Nihon Radiator and Kanto Seiki, is one of Nissan's three main parts suppliers. Nissan owns 37% of Atsugi's shares. Most of its sales are made to Nissan group companies, but the firm has gradually increased its sales to other car makers, such as Fuji, Mitsubishi, Mazda, and Honda. Isuzu signed a parts contract with Atsugi in April 1986.

Atsugi began supplying GM with parts and accessories in 1981. In return, it received technical assistance. During the next several years, as demand for its main product, drive shafts, dropped because of the trend towards front-wheel-drive vehicles, Atsugi began to develop new products. In 1986, Nissan and Atsugi announced they would sell technology for their electronically controlled suspension system to Monroe, a major U.S. manufacturer of shock absorbers. Their system assesses road conditions with supersonic waves and then adjusts the suspension. Monroe would buy sensors from Nissan-related companies in Japan to produce the suspension system and then sell it to GM and other U. S. and Japanese auto makers.

Kyoritsu. In 1981, GM announced it would buy Harada Industry's 20% holdings in Kyoritsu Hiparts, a wire-harness maker affiliated with Nissan. The other two investors in Kyoritsu are Hitachi Cable (40%) and Kanto Seiki (40%); the latter is 44% owned by Nissan.

Tachikawa Spring. Tachikawa, an automobile seat maker, is 20% owned by Nissan. In 1986, it agreed to supply its formed seat cover technology to GM through its U. S. partner, Hoover International, which will manufacture and supply seats to GM. Tachikawa's technology--not yet used in Japan or the United States--molds vinyl or cloth with heat into the desired shape, then attaches the cover to a cushion pad.

Akebono Brakes. Akebono, the largest Japanese brake manufacturer, has had relationships with U.S. companies since the early 1960s, when it accepted investments and technology from Bendix. In 1985, Akebono and GM's Delco-Moraine division announced a 50-50 joint venture, American Brake Industry, that would make drum and disk brakes and other brake parts in the Midwest. The two firms would initially invest $50 million; customers would include GM's Saturn plant and other Japanese and American car manufacturers located in the Midwest. The venture would develop next-generation brakes using electronics technology.

Akebono believed it had world-class technology and costs as much as 20% lower than for comparable products in the United States. GM's expertise in electronics was likely to become more important in the future--for antiskid controls on braking systems, for example, and GM believed that its brake technology could be sold to Japanese auto companies and wanted a Japanese partner to help it develop this business.

NHK Spring. NHK Spring, a Japanese company, is the largest producer of auto suspension systems in the world. It is an independent company, without deep-rooted affiliations with any of the major auto firms, though Nissan, Isuzu, and Mitsubishi are among its major customers. Toyota owns shares of one of NHK's competitors. NHK Spring and Suzuki have a joint venture that makes seats for motorcycles and autos.

In 1985, U.S. auto makers became interested in NHK's fiber-reinforced plastic (FRP) springs. FRP uses glass filaments to strengthen plastic springs, cutting their weight by 32 to 54 pounds. GM first used FRP springs from NHK on the Corvette and later on vans. GM's Inland unit and NHK announced that they would form a 55% NHK/45% GM joint venture in Japan to produce FRP auto suspension equipment; later it would produce electronic controls for suspension and related equipment. The two firms also agreed to establish joint ventures to manufacture car components in the United States, Western Europe, and elsewhere.

Managing the Relationships

The critical links between GM and its component-making partners were between individual Asian firms and the GM divisions that they supplied. A GM executive observed that "In these activities, GM has equity participation, but manages the relationship in the context of vendor relations in general, with, perhaps, more technology transfer than in the usual vendor relation. There generally is no involvement in company management except in the component joint ventures." Divisions gave suppliers forecasts of their needs; lead time and accuracy were especially important for large orders. Vendors also had to understand the new product plans of the divisions so that they could have equipment, capacity, engineering, and other resources ready. This was especially vital for complex components.

Roughly two-thirds of GM's Japanese suppliers had their own sales offices in the U.S. Their reps called on GM divisions and could summon engineering support, either from the United States or from Japan, on short notice. At the same time, GM divisions like Delco and Harrison Radiator had managers based in Japan to help coordinate relationships.

For Isuzu and Suzuki, GM stationed personnel in Tokyo, including manufacturing, marketing, and engineering consultants, planners, procurement and distribution managers, industry analysts, and marketing and engineering specialists. At the Daewoo Motor Company, GM was represented by a career executive who lived in Korea and served as executive vice president of Daewoo Motor Company and as joint representative director and by other consultants.

These people were positioned to advise and assist, using any GM knowledge and experience. When new subjects arose between the parties involving knowledge proprietary to either, the exchange was usually covered by agreement, preceded by the proprietor party's consideration of whether or not to seek royalties or expense reimbursement. Various agreements or practices, formal or by precedent, govern the extent to which significant business decisions are shared. These agreements or practices are different between Isuzu and Daewoo Motor, and are different between Isuzu and other Isuzu-GM affiliations.

Despite the importance of these relationships to the partners involved and efforts on both sides to manage them successfully, several problems arose. One was the NIH, or "not invented here," syndrome--engineers, marketing people, and managers had a tendency to prefer the ideas and products of their parent company rather than of their partner. Functional personnel on both sides also complained at times about the division of labor and opportunities, saying that activities or investment funds were being diverted to the partner or to a joint venture rather than given to them.

How each partner viewed the relationship also depended upon the market conditions it faced. When demand for a company's products was strong, its alliances didn't seem to matter very much. When demand was very weak, functional personnel and operating managers tended to concentrate almost exclusively on fixing their own company's problems, and paid much less attention to distant, overseas relationships. Only when demand fell into some intermediate zone were these relationships taken completely seriously. Changes in the relationship--such as a decision to develop a new product, or shifts in equity investments or operating control--exacerbated many of these tensions.

Finally, GM's dealings with its Asian partners were sometimes complicated by antitrust scrutiny in the United States. For example, the FTC required Toyota and GM to keep detailed logs describing discussions and transactions between the two companies. None of GM's other Asian relationships received this degree of scrutiny, but many of them required detailed discussions with the FTC or the antitrust division of the Justice Department, as well as continuing reports on the ventures.

Events in Early 1988

In January 1988, a GM vice president announced in Beijing an "initial step" in a "comprehensive China-GM program." GM said it would build light engines in cooperation with the Chinese government's auto company, as well as a foundry, an axle works, and operations making starter motors, distributors, and alternators. Press reports in Japan and the U.S. said that Fuji Heavy Industries of Japan, the maker of Subaru cars, would provide technology for the effort and that the partners would ultimately announce plans to make passenger vehicles in China, perhaps by 1990, in a $4.1 billion project.

In March, the Wall Street Journal reported that GM was considering a "radical cure" for falling sales of its imported and joint-venture subcompacts. Sales of the 3 cars had fallen 18% to 272,000 in 1987. It would create the first new nameplate -- "Geo" -- since the introduction of Pontiac in 1926. Chevrolet dealers would create separate display areas or even separate showrooms for updated and renamed models of the Nova, Sprint, and Spectrum, along with an imported Jeep-like, sports utility vehicle made by Suzuki. The reaction among GM dealers was reported to be very enthusiastic.

Exhibit 1

GENERAL MOTORS IN 1988

Balance Sheet Data, 1976-1986
($ millions)

December 31	Cash	Total Assets	Long-Term Debt	Common Equity	Return on Equity
1987	4,706	87,422	4,313	32,989	10.8%
1986	4,019	72,593	4,325	30,444	9.7
1985	5,114	63,833	2,867	29,274	13.7
1984	8,567	52,145	2,773	23,959	18.4
1983	6,217	45,695	3,522	20,483	18.2
1982	3,126	41,398	4,745	18,004	5.3
1981	1,321	38,991	4,044	17,438	1.9
1980	3,715	34,581	2,058	17,531	NM
1978	4,055	30,598	979	17,286	20.3
1976	4,625	24,442	1,070	14,102	20.6

NM-Not Meaningful.

Source: Standard & Poor's Stock Report, February 19, 1986, p. 978; and the 1985 and 1986 annual reports.

Income Data, 1976-1986
($ millions)

Year Ended December 31	Revenue	Operating Income	Operating Income/ Revenue	Capital Expenditures	Depreciation	Interest Expense	Net Income[a]	Net Income/ Revenue
1987	101,782	2,569	2.5%	7,057	6,113	1,631	3,551	3.5%
1986	102,814	1,431	1.4	11,712	6,594	954	2,945	2.9
1985	96,372	4,219	4.4	11,123	6,208	892	3,999	4.1
1984	83,890	4,700	5.6	6,047	4,966	909	4,517	5.4
1983	74,582	5,508	7.4	4,007	5,120	1,356	3,730	5.0
1982	60,026	5,512	9.2	6,212	4,551	1,415	963	1.6
1981	62,699	391	7.7	9,741	4,406	898	333	0.5
1980	57,729	(1,186)	5.2	7,762	4,178	532	(763)	NM
1978	63,221	6,485	15.1	4,564	3,036	356	3,508	5.5
1976	47,181	5,383	15.4	2,307	2,243	284	2,903	6.2

[a]Includes earnings from GMAC and from EDS and General Motors Hughes Electronics after they were acquired.

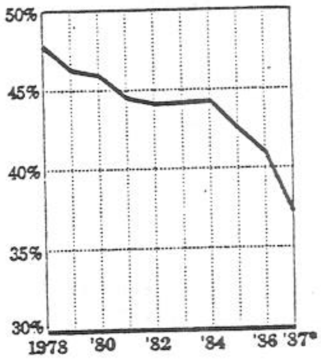
NM-Not Meaningful.

Source: Standard & Poor's Stock Reports, February 19, 1986, p. 978; and the 1985 and 1986 annual reports.

Exhibit 2

GENERAL MOTORS' ASIAN ALLIANCES

GM'S Share of the U.S. Market



[a] Data through October 31, 1987
(Wall Street Journal, December 1, 1987, p.6)

GM's Worldwide Sales
(units in thousands)

	Cars			Trucks & Buses			Total		
	1987	1986	1985	1987	1986	1985	1987	1986	1985
U.S.	3,592	4,302	4,882	1,520	1,520	1,537	5,112	5,882	6,419
Canada	344	545	562	238	192	280	582	737	842
Overseas	1,857	1,783	1,762	214	234	282	2,071	2,017	2,044
Total	5,793	6,630	7,206	1,972	1,946	2,099	7,765	8,576	9,305

Source: General Motors annual reports.

Exhibit 3
GENERAL MOTORS' ASIAN ALLIANCES
Isuzu Sales and Profits
(in millions of yen)

Year Ending October 31	Sales	Net Income	% of Japanese Production	Total Exports (in 1,000 units)
1967	149,336	4,480	3.6%	
1971	197,539	(366)	2.3	17
1972	196,481	(3,440)	2.9	63
1973	262,593	2,415	3.1	60
1974	326,215	2,007	3.8	106
1975	356,302	(8,722)	3.5	113
1976	424,855	7,397	4.3	183
1977	468,758	6,182	4.0	167
1978	572,386	13,434	4.4	223
1979	635,442	12,643	4.4	214
1980	687,713	4,954	4.3	273
1981	727,410	8,510	4.1	259
1982	719,002	6,038	3.8	221
1983	684,624	5,285	3.5	201
1984	769,002	(17,725)	3.8	286
1985	1,016,250	13,384	4.8	408
1986	1,013,434	(3,979)	4.5	394

Sources: Isuzu and Suzuki annual reports.

Suzuki Financial Performance
(in millions of yen)

Year	Sales	Net Profit
1975	87,723	996
1976	166,966	1,468
1977	215,960	3,314
1978	253,392	3,547
1979	271,517	3,451
1980	345,099	4,003
1981	457,779	4,793
1982	551,521	5,470
1983	542,319	6,590
1984	524,259	5,002
1985	580,841	6,027
1986	722,336	6,120

Harvard Business School 9-481-066

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WHARTON REPROGRAPHICS, 18

A FRAMEWORK FOR ANALYZING ORGANIZATIONS

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ORGANIZATION DESIGN I

ENVIRONMENT (Context)

- Economy
- Economics of the Business
- Market place and competition
- Social and Political Forces
- CHANGE - Degrees and types

KEY SUCCESS FACTORS

What does it take to be successful in this business?

- Economics, economies of scale?
- Responsiveness?
- New product innovation?
- Marketing or delivery of goods and services, etc.?

TASK REQUIREMENTS

What must the organization do to perform effectively given its Environment & KSFs?

- What are the basic tasks?
- What Specialization is required?
- What Differentiation is required?

What are the key interdependencies among subunits or activities?

- Among whom/or what/ and where do these interpendencies exist?

Is the organization focusing on the right tasks?

What are the desired patterns of behavior?

ORGANIZATION STRUCTURE

Basic grouping of activities and people:

- Do they fit the "task requirements"?
- Do they facilitate or impede the achievement of key success factors?
- Does the basic structure deal with key interdependencies and the required need for integration?

Integrating devices

- plans and procedures
- hierarchy
- information systems
- task forces
- integrating roles
- integrating departments
- matrix arrangements, etc.

Are they adequate to achieve needed integration?

PEOPLE

What are the human resources available to the firm?

- Do they fit current and future needs?
- What needs, if any, exist for development and training?
- What needs, predispositions, values, abilities do they bring?
- Does the existing structure, operating mechanisms, and culture facilitate desired patterns of behavior given the people you have?

STRUCTURE & OPERATING MECHANI[S]

OPERATING MECHANISMS

MEASUREMENT & CONTROL SYSTEMS

- *Control systems*
- *Performance appraisal systems*
- *MBO or other assessment systems*

- What outputs or behavior is measured?
- Does it influence behavior in a way that "fits" KSF & Task Requirements?
- Do they "fit" the people and culture?
- Do they influence desired patterns of behavior?

REWARD SYSTEMS

- *Basic compensation*
- *Bonus and commission, etc.*
- *Intrinsic satisfaction*
- *Opportunities for advancement*
- *Recognition and praise*
- *Other rewards*

- What is rewarded?
- How does it affect desired patterns of behavior?
- Do rewards fit people, task and culture?

TRAINING & DEVELOPMENT

- *OJT*
- *Formal training programs*
- *Team building or other organizational development activities*
- *Career development*

- What development do people need?
- Are current systems adequate?
- How do they affect desired patterns of behavior?
- Do they fit people, task and culture?

RECRUITMENT & SELECTION

Who is selected?

- What do they bring?
- How do selection practices affect people and culture?
- Do they "fit" KSFs, task, and result in desired behavior?
- Are we hiring the kinds of people we need given the KSFs and TASK?

CULTURE & MANAGEMENT STYLE

What are the prevalent norms and values in the organization?

- Conflict resolution processes
- Informal communication patterns
- Status patterns, etc.
- Do they impede or facilitate integration of effort?

Does the culture enhance or detract from effectiveness?

- Do they fit KSFs, task requirements and operating mechanisms?

Does management style fit KSFs, organization's stage of development, and enhance desired outcomes?

→

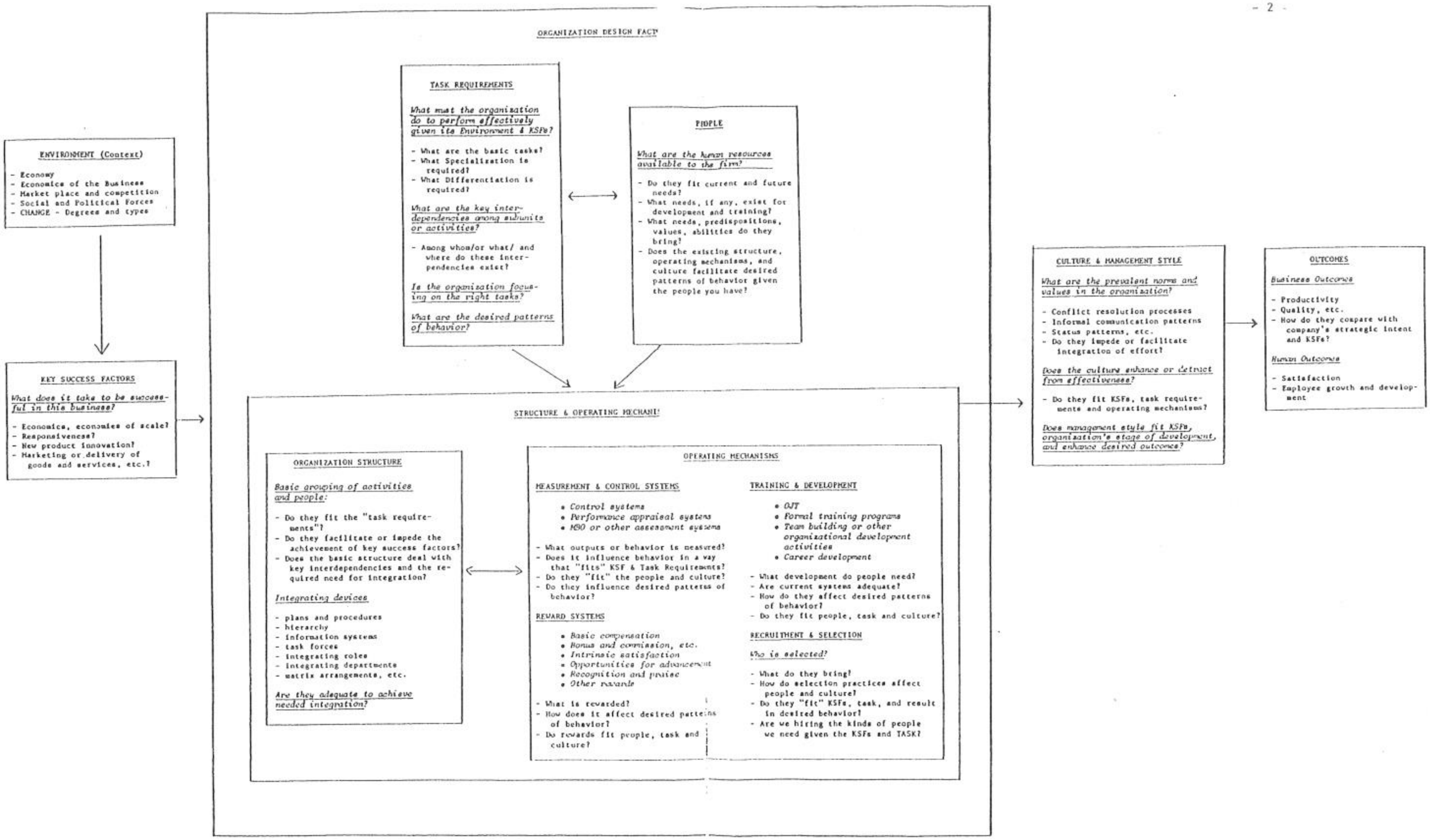
OUTCOMES

Business Outcomes

- Productivity
- Quality, etc.
- How do they compare with company's strategic intent and KSFs?

Human Outcomes

- Satisfaction
- Employee growth and development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19

WHARTON REPROGRAPHICS

Asea Brown Boveri

On August 10, 1987, following six weeks of highly secret negotiations and special directors meetings in Västerås, Sweden and Zürich, Switzerland, a simultaneous news conference was called in Stockholm and Baden, Switzerland. Within minutes, the stunning details of the largest cross-border merger in European history flashed across newswires throughout the world: the two giants of the European electrical equipment industry—Asea AB of Sweden and BBC Brown Boveri Ltd. of Switzerland—would merge to create Asea Brown Boveri (ABB).

The new ABB would become the world's largest competitor in power generation, transmission and distribution; in addition, the combined company would be a leading world supplier of process automation systems, robotics, high speed locomotives and environmental and pollution control equipment. Asea's 65,000 employees would be combined with BBC's 85,000 employees to create a company comprising 850 separate legal entities operating in 140 countries. In 1988, its first year of combined operations, the new company's pretax income would be US$ 536 million on sales of US$ 17.8 billion.

Asea's chief executive officer, Percy Barnevik, (age 46 at the time of the merger) would assume the position of president and chief executive officer of ABB. Thomas Gasser (age 54 at the time of the merger) would become deputy chief executive officer. These men faced the challenge of building a new company on the foundation of two companies that had spent almost a century facing each other as arch rivals.

Creating the New Company

The announcement of the proposed merger was greeted with considerable optimism, with BBC's shares rising 10% in Zurich and Asea's advancing 15% in Stockholm. Asea was seen as contributing superior current profit performance, sophisticated management controls and marketing aggressiveness, while BBC brought a strong order book, $4 billion in cash and

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Professor Robert Simons and Professor Christopher Bartlett prepared this case as the basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation.

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marketable securities, and technical expertise. Barnevik's strong leadership also provided analysts with reasons to be bullish. "He's Europe's Jack Welch," said one, repeating an oft-made comparison.

Reshaping the Organization

ABB would start operating as a merged company on January 1, 1988. With only 4½ months to make preparations, Barnevik believed strongly that there could be no honeymoon period, and decided to initiate all the needed changes within the first year. "Sales had to be kept up," he said, "and it was important not to get internally preoccupied. We didn't want people to become paralysed by uncertainty."

The week after the merger announcement, Barnevik selected five key managers from each company to form a ten person top level work group. Breaking this group into task forces, he charged them with analyzing how the operations of Asea and BBC could best be fitted together. Within two months, the main features of the new organization had been agreed upon—a new matrix structure that defined 40 business areas, grouped into business segments on one hand and integrated on a national basis through local holding companies on the other hand.

Staffing the New Structure

In late October, Barnevik announced that he wanted the new organization operational by Christmas, and that meant filling hundreds of key management positions. To ensure that this process was perceived as fair, he had the personnel directors from Asea and BBC cross-interview and make recommendations on almost 500 senior level managers from the two companies. As part of the process, Thomas Gasser and Percy Barnevik personally interviewed over 100 key managers each.

The criteria for those selected for top jobs were demanding: they had to be risk-takers, team players, leaders, and motivators. In Barnevik's words,

> We sought people capable of becoming superstars—tough-skinned individuals who were fast on their feet, had good technical and commercial backgrounds, and had demonstrated the ability to lead others.... For the merger to work, it is essential that we have managers who are open, generous, and capable of thinking in group terms.[1]

Communicating Objectives and Priorities

With the new team in place, Barnevik initiated a major program to communicate ABB direction and priorities. In January 1988 he convened a meeting of ABB's top 300 managers in

1. Jules Arbose, "ABB: The New Energy Powerhouse," *International Management*, June 1988.

Cannes to explain his management philosophy, operating policies, and to set corporate targets.

Over three days, Barnevik set the agenda for the organization, illustrating concepts and priorities with data contained in 198 overhead transparencies. He also emphasized the importance of the "policy bible"—a 21 page booklet that described the new organizational relationships, the commitment to decentralization and strict accountability, and the company's approach to change. He then asked the 300 managers to translate this message into their local languages and convene similar interactive forums with their own organizations so the message would reach another 30,000 ABB people worldwide within sixty days.

Building Reporting Systems

Barnevik knew that the new organization could not work without a uniform reporting system that could provide managers with accurate and timely information on sales, orders, margins, and other data vital to decision making. When outsiders predicted that such a system could take as long as three years to design and implement in a company as large and complex as ABB, Barnevik and the development team set out to have it in place by August 1988 (in time for the 1989 budget). When the new system (dubbed Abacus) was unveiled on schedule, Barnevik hosted a champagne party for the development team and their spouses.

Rationalizing Operations

The information provided by the new Abacus system was vital to Barnevik's plans to exploit economies in a global enterprise. After analyzing manufacturing costs in all markets, teams of business area managers began discussions on how to increase economies of scale and scope by designating certain plants as specialized production sources for major products around the world. They also introduced other cost savings measures such as component outsourcing, overhead cuts, and inventory reduction. Each business area manager was also responsible for identifying best practices among its participating companies and ensuring the learning was transferred.

Acquiring New Companies

The substantial amount of cash that BBC brought to the merger, supplemented by the resources squeezed from the new organization through rationalization and tighter controls, allowed Barnevik to begin an acquisition program that would restructure the industry. ABB's expansion strategy was rooted in Barnevik's strong belief that the long-term slide in new power generation capacity would reverse itself soon to meet growing demand. Further, because 95% of all past electrical generation contracts in European Community countries had been won by strong national companies, Barnevik believed that new orders would be awarded only to companies that had a strong local presence. These twin beliefs were behind a massive acquisition/joint venture program designed to make ABB "an insider not an invader" in major national markets throughout Europe.

In Germany, Barnevik acquired AEG's steam turbine business and entered a nuclear reactor joint venture with Siemens; in Italy, he signed a joint venture agreement with Finmeccanica; in UK, he created a partnership to acquire BREL the former British Rail Engineering Limited, and linked up with Rolls Royce. In all, ABB acquired or entered into joint ventures with over 40 companies within 18 months of the announcement of the merger.

By early 1989, Barnevik's attention turned to the huge United States market, and negotiations to acquire Westinghouse's power distribution and transmission business as well as the publicly-traded Combustion Engineering group. By 1990, with Westinghouse and Combustion Engineering acquisitions complete, ABB employed 215,000 people in 1,300 wholly-owned subsidiaries around the world and generated US $27 billion in revenues (see Exhibit 1). Barnevik reflected on the blistering pace of ABB's acquisitions:

> This is an industry that hasn't changed much in 40 years. I wouldn't say that [ABB's acquisition of all these national companies] is ideal, but you have to move when the industry is moving.... If it works it gives us a hell of a competitive edge.

Industry Reaction

This frenetic action in ABB during the late 1980s triggered a major restructuring of the electrical industry throughout Europe. In response to ABB's actions, competitors began reorganizing themselves. Britain's GEC formed a joint venture with Alsthom-Jeumont of France to become Europe's number two power equipment company behind ABB, pushing Germany's Siemens, the long time industry leader, into third place.

Writing in an internal publication, General Electric's Senior Vice President of International Operations, Paulo Fresco, reflected the feelings of many in the industry:

> The lights are going out all over Europe, and the buccaneers have been turned loose. Among them is Percy Barnevik—this Swede with a beard who swings from country to country like the actor Errol Flynn, cutting deals and forming alliances... A convalescing GE power system may find him the most formidable adversary it has ever faced.

Percy Barnevik: ABB's New Leader

Percy Barnevik was a quiet spoken, bearded man with strong views and a clear vision of his company's future. Throughout his youth in Uddevalla, on the rocky Swedish coast, Percy had worked after school and on weekends in his father's print shop, learning the values of hard work and teamwork. After earning his economics degree at the Gothenburg School of Economics, he spent two years as a post graduate student at Stanford University.

After working in data processing for Sweden's Johnson Group for three years, Barnevik joined the machine tool company Sandvik in 1969, becoming group controller. In 1975 he was given the opportunity to manage Sandvik's U.S. affiliate, and over the next four years his effectiveness in that position caught the eye of Asea's board of directors which hired Barnevik

in 1980 to run Asea. His success in rejuvenating the plodding Asea in the early 1980s made him the leading candidate for the top job at ABB.

Even to many of his top managers, Barnevik remained an enigmatic figure. He was clearly European in his origins, yet had been influenced by his American education and management experience, and was truly global in his perspective; he understood technology and was strongly committed to its development, yet remained uncompromisingly marketing oriented; he believed passionately in his long term vision for ABB and encouraged managers to develop bold strategies to achieve it, yet he insisted that they also achieve their short term results; and while his personal style was informal and unassuming, he could also be intolerant and blunt. But even those who did not quite understand him, inevitably respected him.

Three characteristics typified Barnevik's personal management style: (1) a strong work ethic, (2) constant communication, and (3) decisiveness. These values were imprinted on the new company he helped to create. Barnevik operated not only at the level of broad strategy, but developed an impressive feel for the details of ABB's ongoing operations. Barnevik believed strongly in setting clear individual targets and providing managers with feedback on their performance. He tracked key current issues and problems and followed up with individual managers who were expected to be able to answer his incisive questions.

Barnevik travelled constantly, and estimated he was on the road 200 days a year. Yet he insisted that while he may often be out of town, he was never out of touch. In his plane or company car, he was frequently on the telephone with key managers worldwide. With his dry sense of humor he pointed out: "I travel a lot, but I'm normally in my office two days a week—Saturday and Sunday."

The intensive travel underscored Barnevik's belief in the importance of constant communication with the organization. "A leader must first be a teacher," he said. Barnevik believed strongly that everyone must understand the corporate philosophy and objectives and the reasons behind them. On virtually all his trips, he took a large brief case filled with transparencies. His presentations, using two overhead projectors simultaneously and reciting the numbers displayed from memory, were legendary within ABB.

Barnevik believed that ABB managers must expand their jobs and make more decisions. This pressure on managers to decide—and decide quickly—was perhaps the personal characteristic that he had imprinted most indelibly on ABB. His philosophy had been repeated over and over to his team:

> Nothing is worse than procrastination... When I look at ten decisions I regret, there will be nine of them where I delayed... Better roughly and quickly than carefully and slowly."

He also promoted his "7-3 formula," which reinforced the notion that it was better to make decisions quickly and be right seven out of ten times than to waste time trying to achieve the perfect solution. "Take the initiative and decide—even if it turns out to be the wrong thing. The only thing we cannot accept is people who do nothing." But decisions had to be based on a sound understanding of the business, and on Barnevik's team, sloppy analysis or superficial

knowledge were unacceptable. To emphasize that point, he had banned the phrase "I think" at meetings. ("Either you know or you don't," he said.)[2]

Managing the New Company

By early 1989, eighteen months after the merger was announced, Barnevik shifted his focus from putting the new company together to making it work effectively.

The Organizing Principles

The complex new organization was built on twin principles of (1) decentralization of responsibility and (2) individual accountability. Barnevik explained:

> The only way to structure a complex, global organization is to make it as simple and local as possible. ABB is complicated from where I sit. But on the ground, where the real work gets done, all of our operations must function as closely as possible to stand-alone operations. Our managers need well-defined sets of responsibilities, clear accountability, and maximum degrees of freedom to execute.
>
> We are fervent believers in decentralization. When we structure local operations, we always push to create separate legal entities. Separate companies allow you to create real balance sheets with real responsibility for cash flow and dividends. With real balance sheets, managers inherit results from year to year through changes in equity.
>
> ABB is a huge enterprise. But the work of most of our people is organized in small units with P&L responsibility and meaningful autonomy. Our operations are divided into nearly 1,200 companies with an average of 200 employees. These companies are divided into 4,500 profit centers with an average of 50 employees.[3]

The Matrix Organization

Barnevik used the organizing principles of decentralization and accountability as a foundation for his strategic vision of a world class competitor built on strong national companies. The way he and his management team chose to do this was through the matrix structure that was put in place immediately following the merger. As Barnevik saw it:

> ABB is an organization with three internal contradictions. We want to be global and local, big and small, radically decentralized with centralized reporting and

2. Jonathan Kapstein and Stanley Reed, "Preaching the Euro-Gospel: ABB Redefines Multinationalism," *Business Week*, July 23, 1990, p. 36.
3. William Taylor, "The Logic of Global Business: An Interview with ABB's Percy Barnevik," *Harvard Business Review*, March-April 1991, 91-105.

control. If we resolve those contradictions, we create real organizational advantage.

You want to be able to optimize a business globally—to specialize in the production of components, to drive economies of scale as far as you can, to rotate managers and technologists around the world to share expertise and solve problems. But you also want to have deep local roots everywhere you operate—building products in the countries where you sell them, recruiting the best local talent from the universities, working with the local government to increase exports. If you build such an organization, you create a business advantage that's damn difficult to copy.

The matrix is the framework through which we organize our activities. It allows us to optimize our business globally and maximize performance in every country in which we operate.[4]

Exhibit 2 presents a schematic outline of the matrix structure in use at ABB. ABB was organized into 1,300 separate operating companies (listed at the top of each column in Exhibit 2); each company was a legal entity incorporated and domiciled in one of the 140 countries in which ABB operated. Each operating company had a president and management board. These 1,300 operating companies were managed by region. Thus, a company manager would focus his or her efforts on the operations of that business in one country and be responsible for:

- customer-based regional strategies
- regional results and profitability
- day-to-day management of individual profit centers
- human resource development within the regional unit
- relationships with local governments, communities, labor unions, and the media.

Examples of operating companies were ABB Power Generation Inc., North Brunswick, New Jersey, (building power plants) and ABB Fläkt Oy, based in Helsinki, Finland (building environmental protection systems).

Company managers reported in turn to a regional manager who was typically responsible for all the operating companies within a specific country. Gerhard Schulmeyer, for example, one of eleven executive vice presidents, was responsible for 110 ABB operating companies in the United States, including ABB Power Generation Inc. Bert-Olof Svanholm, another executive vice president, was responsible for the 30 ABB companies operating in Finland, including ABB Fläkt Oy.

The other dimension of the matrix (the vertical axis of Exhibit 2) reflected the second clustering of activities of the enterprise into 65 Business Areas (or BAs). Each Business Area represented a distinct worldwide product market. The power transmission activities of ABB, for example, were classified into seven BAs:

4. William Taylor, *op. cit.*

- Cables
- Distribution Transformers
- High Voltage Switchgear
- Electric Metering
- Network Control and Protection
- Power Systems
- Power Transformers

Each Business Area was the responsibility of a BA manager accountable for:

- worldwide results and profitability
- development of a worldwide strategy
- R&D and product development
- worldwide market allocation and sourcing
- price strategy and price coordination between countries
- purchasing coordination
- product and production allocation
- transfer of know-how in design, production, and quality
- acquisitions and divestments

Each Business Area manager reported in turn to one of the eleven executive vice presidents responsible for individual business segments (i.e., clusters of related Business Areas).

At the risk of oversimplifying, Business Area managers were responsible for developing worldwide product and technology strategies. Regional managers were responsible for executing these strategies based on the unique needs of local markets. Exhibit 3 illustrates this concept.

The two dimensional reporting matrix—with regional responsibilities running along one dimension and product responsibilities along the other—required two bosses for each operating manager.

Josef Dürr, president of ABB High Voltage Switchgear Ltd., Zurich, explained,

> Our organization seems difficult for an outsider to understand; I will draw you a picture (see Exhibit 4 for Durr's diagram).
>
> My company is part of the power transmission business here in Switzerland. Going up the regional part of the matrix, I report directly to Willy Roos who is responsible for all of the various power transmission businesses based in Switzerland. Willy in turn reports to Ed Somm who is responsible for all ABB businesses—power transmission and others—in Switzerland. Somm is an executive vice president and one of the eleven members of the group executive management.
>
> On the BA dimension, I report directly to Anders Larsson who sits in Sweden. Anders is responsible for businesses like mine—high voltage switchgear—all around the world. Anders Larsson reports to Göran Lindahl, who is the executive vice president in charge of the power transmission segment of the business worldwide.

> Thus, I am directly responsible to both Roos and Larsson. I have to coordinate my strategies and targets with each of them, be prepared to answer their individual concerns, and be accountable to both for my performance.
>
> But each of them also answers to two masters. Roos reports to Somm (regional manager responsible for Switzerland) and to Lindahl (business segment manager responsible for power transmission worldwide).
>
> Larsson, who sits in Sweden and runs the Swedish switchgear company, reports to Anders Narvinger (regional segment manager responsible for all transmission businesses in Sweden) and Lindahl (power transmission segment).
>
> Have I confused you?

The eleven executive vice presidents who formed the group executive management served as the critical integrating link in the matrix structure. Typically each individual assumed responsibility for one or more business segments as well as several regions. Exhibit 5 illustrates the responsibilities of each of the eleven men.

Göran Lindahl, 46, one of the executive vice presidents, explained how it all worked,

> Our strategy is to be global with technology and local in our customer orientation. My business does US$ 5.5 billion in annual sales. The business operates 132 factories in 34 countries. That sounds huge doesn't it? But you need to understand that the power transmission business is made up of 750 different profit centers, each with its own P&L. The average profit center generates only $ 7 million in sales with 45 people.
>
> I have global responsibility for power transmission. That means I am concerned with long term strategy for the business: product planning, new technologies, acquisitions, and divestments.
>
> If I find overcapacity in a product line, I will suggest closing one or more factories. Do you think that you will ever find a manager of a local company suggesting we close down a piece of his business?
>
> The local manager is there to be close to the customer, to execute the strategy. If you look at this slide I use in my presentations (Exhibit 6), you will see the concept I am talking about. The Business Areas are concerned primarily with top-down strategy setting as shown by the left arrow. The BAs secondary concern is with actual operations. By the same token, if you look at the right arrow—the bottom-up one—the situation reverses. The regional companies have major responsibility for operations and secondary involvement in strategy. But the difference is one of degree. The distinction is not black and white.
>
> The center of the chart illustrates that budgets and plans are the key link in this company between strategy and operations.

The ABACUS System

The centrality of budgets and plans in Lindahl's presentation chart underlined the importance that ABB executives attached to their management systems in executing their strategy. A computer-supported reporting system named "ABACUS" provided the ongoing information required for oversight and complex decision making. Barnevik explained,

> We have the glue of transparent, centralized reporting through a management information system called ABACUS. Every month, ABACUS collects performance data on our 4,500 profit centers and compares performance with budget and forecasts. The data are collected in local currencies but translated into U.S. dollars to allow for analysis across borders. The system also allows you to work the data. You can aggregate and disaggregate results by business segments, countries, and companies within countries.
>
> We look for early signs that businesses are becoming more or less healthy. On the tenth of every month, for example, I get a binder with information on about 500 different operations—the 50 Business Areas, all the major countries, and the key companies in key countries. I look at several parameters—new orders, invoicing, margins, cash flows—around the world and in various business segments. Then I stop to study trends that catch my eye.
>
> Let's say the industry segment is behind budget. I look to see which of the five Business Areas in the segment are behind. I see that process automation is way off. So I look by country and learn that the problem is in the United States and that it's poor margins, not weak revenues. So the answer is obvious—a price war has broken out. That doesn't mean I start giving orders. But I want to have informed dialogues with the appropriate executives.

Implementation

While many admiring articles had been written about the transformation that Barnevik had begun in ABB, the big question in most observers minds was whether he and his top management team could make the demanding management principles and sophisticated organization structure work effectively. Could Barnevik reconcile the three dilemmas ("we want to be global and local, big and small, radically decentralized with centralized control") that he had built into this organization? Could he achieve the mission that he and his top managers had set out for ABB (see Exhibit 7).

As Barnevik himself acknowledged, "Now comes the crucial test. We have to prove that these new alliances are capable of delivering the advantages that we planned."

Exhibit 1

1990 Revenues by Region

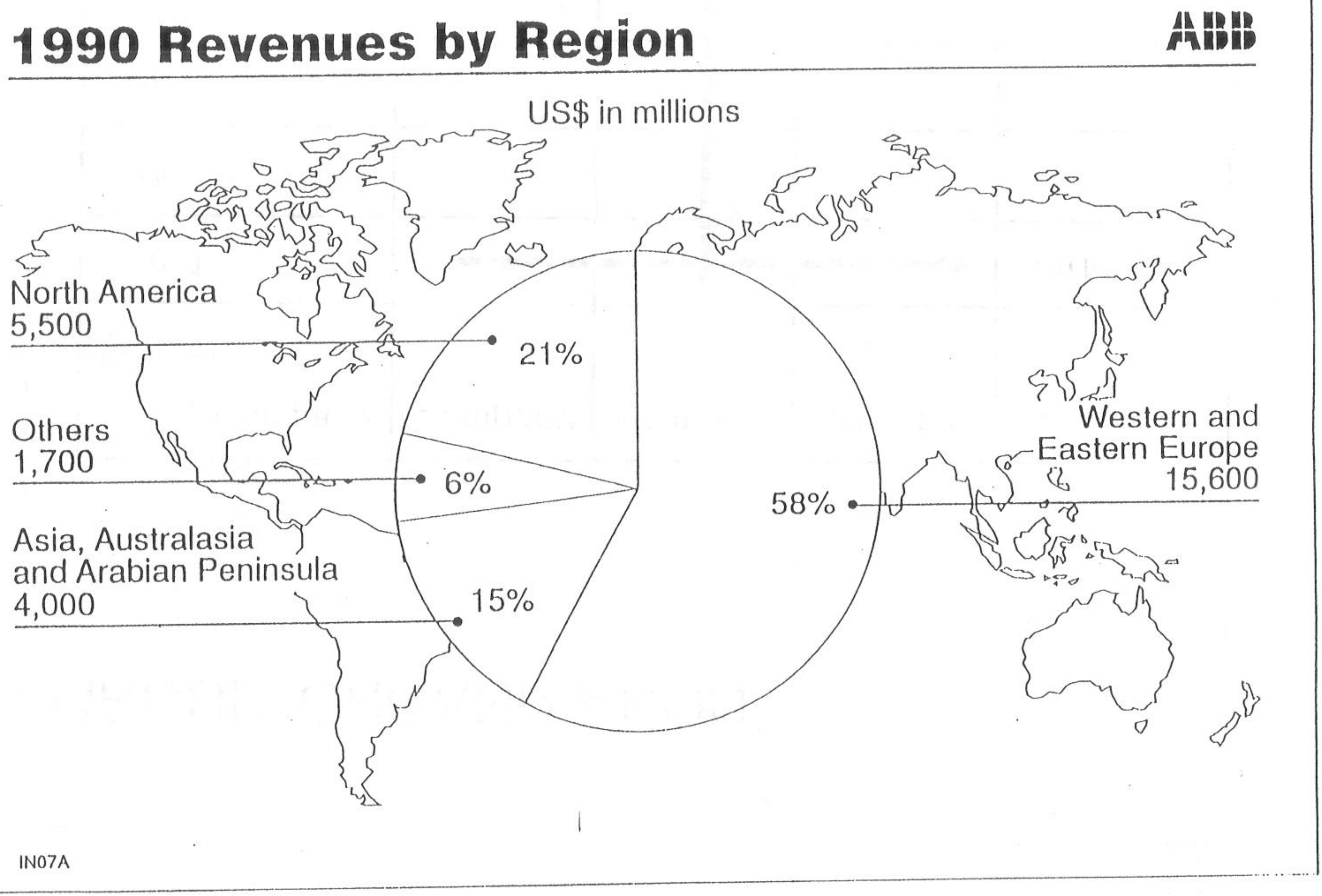
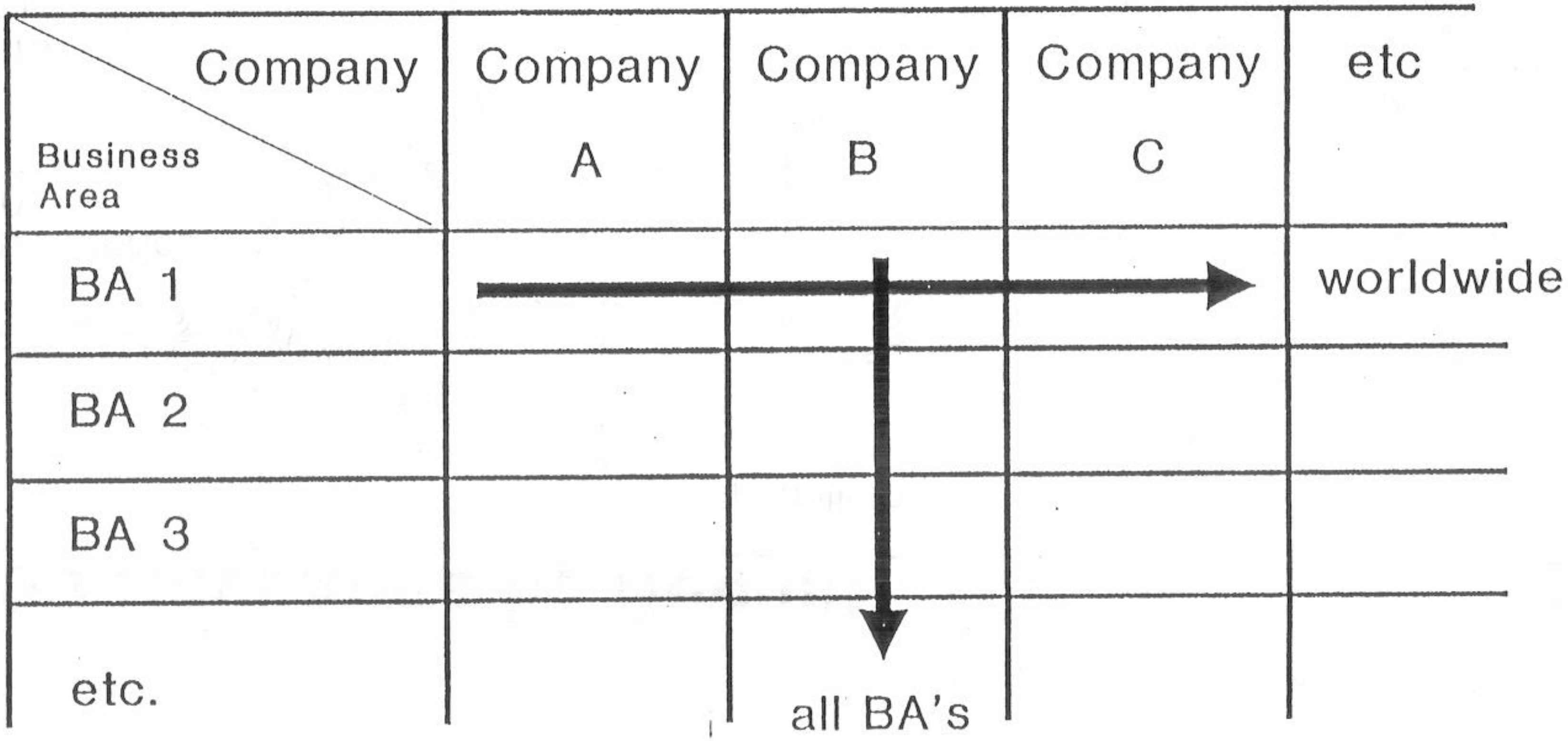


Exhibit 2

GROUP ORGANIZATION

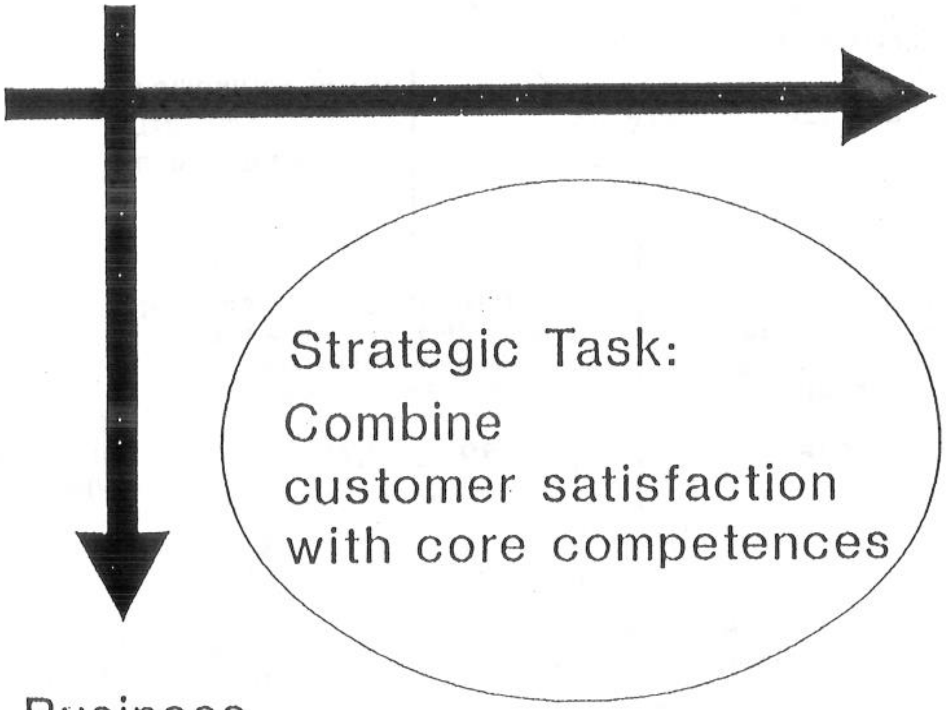
Matrix:



CE11/se

Exhibit 3

THE MATRIX ORGANIZATION



<u>Region</u>

Op.Task: Networking
Focus: People
Customers
Ind.environment

<u>Business</u>

Op.Task: Efficiency
Focus: Product/Technology

se/ce316

Exhibit 4

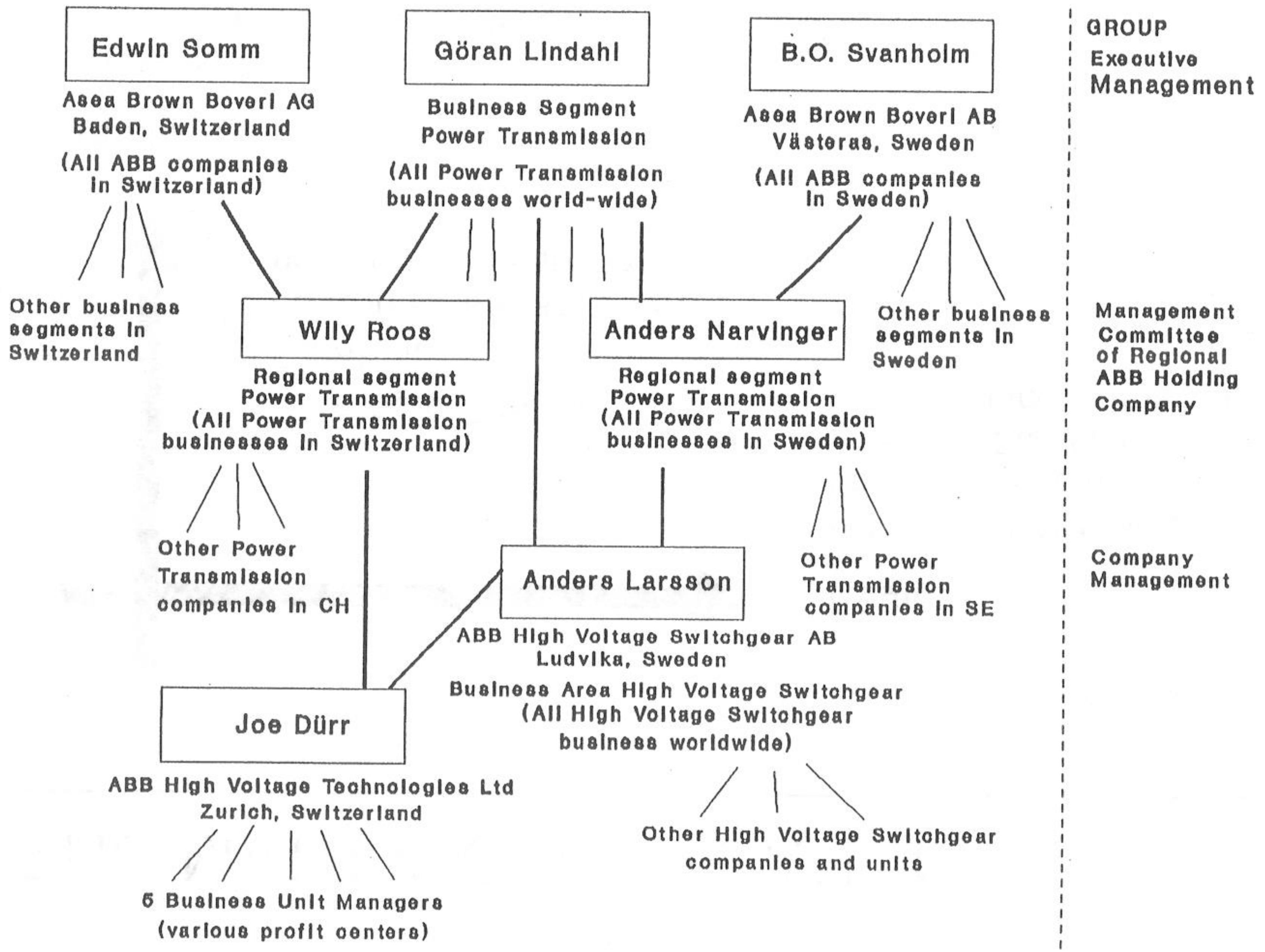
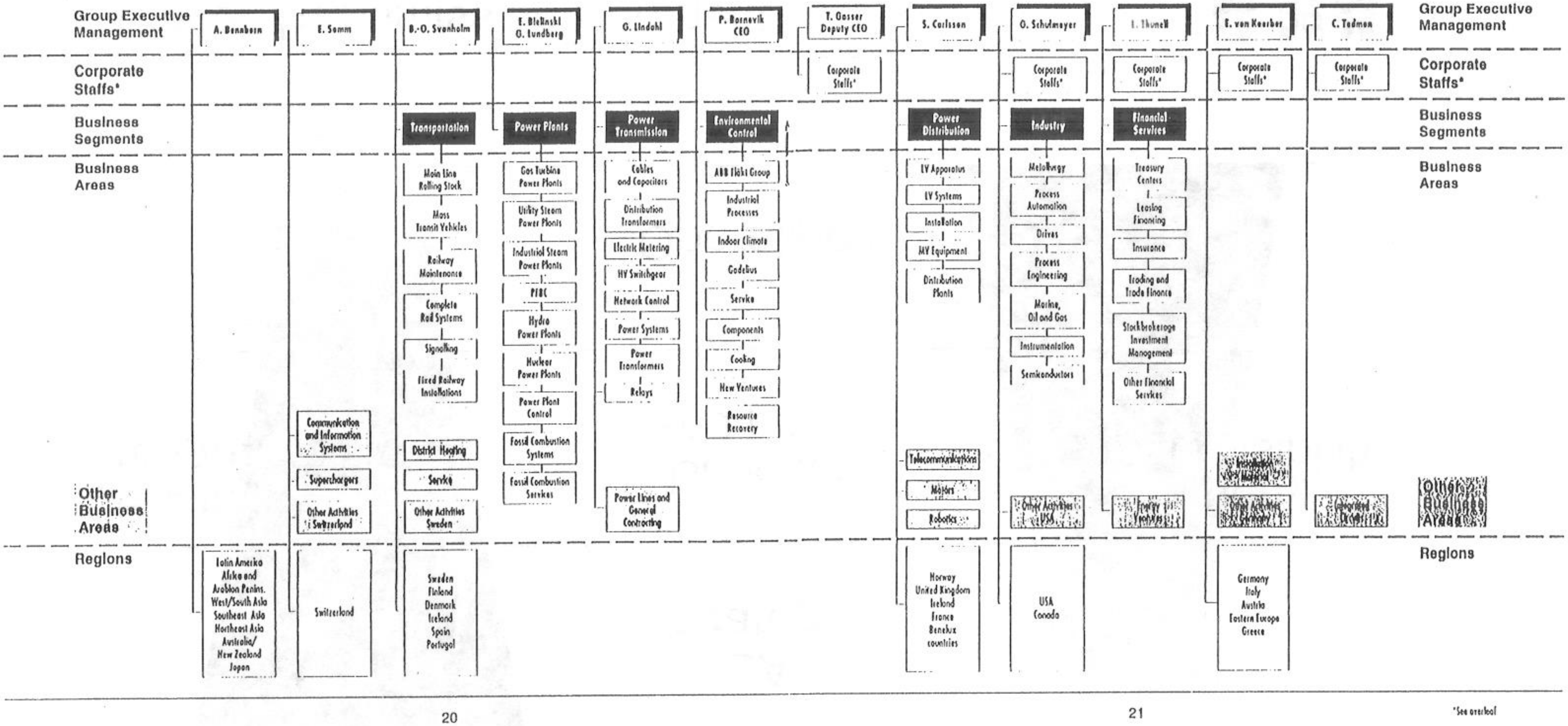
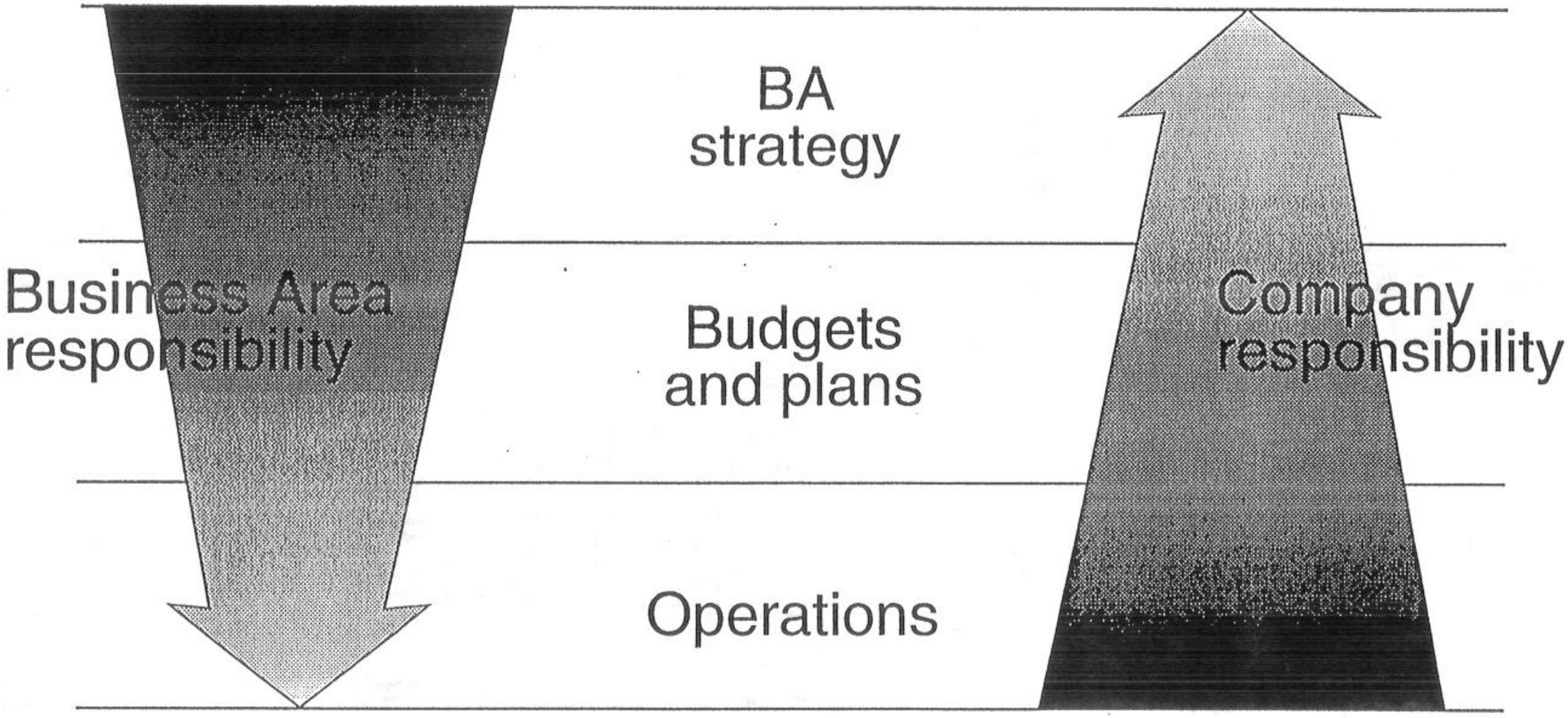

Edwin Somm
Asea Brown Boveri AG
Baden, Switzerland
(All ABB companies in Switzerland)
Other business segments in Switzerland
Göran Lindahl
Business Segment
Power Transmission
(All Power Transmission businesses world-wide)
B.O. Svanholm
Asea Brown Boveri AB
Västeras, Sweden
(All ABB companies in Sweden)
Other business segments in Sweden
GROUP
Executive
Management
Willy Roos
Regional segment
Power Transmission
(All Power Transmission businesses in Switzerland)
Anders Narvinger
Regional segment
Power Transmission
(All Power Transmission businesses in Sweden)
Management Committee of Regional ABB Holding Company
Other Power Transmission companies in CH
Anders Larsson
ABB High Voltage Switchgear AB
Ludvika, Sweden
Business Area High Voltage Switchgear
(All High Voltage Switchgear business worldwide)
Other Power Transmission companies in SE
Company
Management
Joe Dürr
ABB High Voltage Technologies Ltd
Zurich, Switzerland
5 Business Unit Managers
(various profit centers)
Other High Voltage Switchgear companies and units

Exhibit 5



*See overleaf

The Matrix Organization



Power Transmission Segment

ABB ASEA BROWN BOVERI

Exhibit 7

ABB's MISSION, VALUES, AND POLICIES

B ABB's Mission

Worldwide economic growth requires dependable and efficient electric power. ABB is committed to help meet this need by promoting energy efficiency, higher productivity, and quality in all its activities. With its advanced technologies and environmental protection techniques, ABB's contribution to sustainable growth is environmentally sound and will make economic growth and improved living standards a reality for all nations throughout the world.

Our desire to increase the value of our products is based on continuous technological innovation and on the competence and motivation of our employees. Our mission is to be a global leader and to act like one. We will be the most competitive, competent, technologically advanced, and quality-minded electrical engineering company in our fields of activity.

ABB's worldwide leadership position, our presence as a domestic company in key markets, our commitment to research and development, and the motivation of our personnel provide the basis for achieving enhanced customer value and ensuring long-term benefits to our employees and shareholders. As a good corporate citizen, ABB is aware of and fulfills its obligations to society in general, and to our communities in particular.

Everyone in ABB is committed to this mission and the intrinsic values underlying it.

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20
WHARTON REPROGRAPHICS

Compaq Computer Corporation

Background

In early 1982 three former Texas Instruments employees held a meeting at a Houston pie shop. The three used a placemat to sketch the design of what would become Compaq Computer Corporation's (Compaq's) first product, an IBM-PC-compatible portable microcomputer. First shipped in January 1983, the Compaq Portable was a tremendous success. It led Compaq to the highest first-year revenues of any corporation in U.S. history.

Compaq later had several more striking successes. It achieved *Fortune* 500 status after only four years, becoming the fastest company ever to do so. Sales reached $1 billion in 1987—again, the fastest ever at the time. Sales reached almost $3 billion in 1989, by which time Compaq had become the leading industry-standard[1] microcomputer manufacturer. In early 1990 Compaq employed over 9,000 people and marketed systems in over 60 countries (see **Exhibit 1**).

Compaq's growth was remarkable given the dynamic, competitive nature of its market. Besides IBM, several other major computer manufacturers had tried to dominate the microcomputer market, among them Xerox, DEC, Hewlett-Packard, AT&T, ITT, Olivetti, and Wang. Apple Computer's well-known Macintosh had also had considerable success in several market segments. Several startup companies such as AST Research, Televideo, and Wyse had entered the market with varying degrees of success.

Compaq had remained focused on the industry-standard marketplace, launching several generations of new products. Its philosophy was to wait until technology could provide a "no compromises" solution to users' needs, rather than rushing a product out as soon as technology made it barely feasible. This approach had produced consistently successful products (see **Exhibit 2**).

E. Geoffrey Love prepared this case under the supervision of Professor Robert G. Eccles as the basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation.

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1. After IBM introduced the PS/2 and the Microchannel architecture in 1987, the term "IBM PC-compatible" was replaced by "industry-standard" to avoid confusion, since few non-IBM machines were compatible with the new Microchannel architecture.

Compaq had initially marketed through dealers only and had retained this single-channel focus. By 1990 Compaq had a network of over 3,000 dealers. It had concentrated on addressing the dealer channel's traditional weaknesses (e.g., training, service, and support) rather than multiplying distribution channels and thus creating interchannel conflicts. Compaq's pricing strategy was unusual: it had not tried to underprice IBM, as most of its competitors had. Instead, it emphasized superior functionality and quality, symbolized in its advertising theme, "It simply works better."

Compaq went international in 1984, establishing European and international headquarters in Munich and initially marketing in France, Germany, and Great Britain. International sales enjoyed remarkable growth: sales at least doubled every year from 1984 to 1988. In 1989 Compaq became the number two[2] PC manufacturer in Europe with a 9% market share, eclipsing Apple's 8%. In the first quarter of 1990, Compaq's international sales exceeded North American sales for the first time ever.

Management and Organization

Rod Canion, CEO, was the unquestioned leader of Compaq. A veteran of Texas Instruments' (TI) Terminals and Peripherals division, he had founded Compaq with fellow TI veterans Jim Harris, senior VP, engineering, and Bill Murto (no longer with Compaq). Many other senior managers at Compaq were also TI veterans, including the presidents of the North American and the Europe and international business units, the CFO, and several senior VPs.

Canion explained that one reason Compaq had grown so fast was its practice of "hiring for tomorrow." New managers' responsibilities were expected to grow to levels that matched, and then exceeded, their prior experience. For example, Eckhart Pfeiffer, president, Europe and international, had already run a $500-million division at TI when he joined Compaq in September 1983. He joked that he had left Houston with a check for $20,000 and the charge to lead the startup of Compaq's international operations; international sales reached $1.3 billion in 1989.

Canion also emphasized "balance." Compaq managers tried very hard to have all the elements for success (product design, marketing, manufacturing, service, finance, etc.) grow together, rather than emphasizing one to the exclusion of others. Canion described Compaq's philosophy as "doing the basics right." He believed if Compaq could maintain the culture and processes that had made it successful, then success would continue.

Canion's personal abilities were highly regarded. Daryl White, CFO and senior VP, described him as especially strong in working with people: "He's one of the few people I've dealt with who truly doesn't 'type' people's opinions or hold grudges in any way. He takes every issue as a brand new issue to discuss to the fullest. He is fair and he leads by example." Canion apparently had a talent for bringing up sensitive issues in the middle of meetings in a way that avoided bruising egos. Canion's impact was felt throughout Compaq. One production worker said, "What meant the most to me was when he stopped by and talked with us for a few minutes. I was at AT&T for 17 years and I never even saw the president."

2. By revenue as measured through the dealer channel.

Compaq had been organized functionally except for a brief period with a divisional structure in 1984. The divisional structure had been intended to stimulate new-product development, but it resulted in overlap and conflict. Management soon concluded that Compaq was not really in separate businesses, so it returned to a functional organization to retain focus.

There were two profit centers in 1990: North America and International. Their two presidents (Michael Swavely and Eckhart Pfeiffer, respectively) reported to Canion, along with several functional senior VPs (see **Exhibit 3**). The functional areas were subdivided into cost centers. Most of Compaq's senior executives had been with the company since 1983 or earlier, so they had seen almost all of its growth.

Internationally, the organizational structure was based on country subsidiaries. Compaq established a separate subsidiary in each major country it sold computers in. The largest were in Great Britain, France, Germany, Australia, and Italy. Country managers reported directly to Pfeiffer and had considerable initiative in marketing and sales planning and operations, although major decisions (involving pricing, advertising programs, or dealer discounting policies, etc.) required approval from international headquarters and/or Houston.

Compaq had three manufacturing locations in 1990. Most manufacturing was done in Houston. In 1987 Compaq opened a manufacturing plant in Erskine, Scotland; by 1990 it employed 800 people and supplied more than half of European market needs. In 1987 a printed circuit board manufacturing plant was opened in Singapore. Compaq's manufacturing facilities were state-of-the-art. They did mainly circuit board and final unit assembly and testing. Mechanization had contributed significantly in reducing the labor content to about 1% of overall product cost.

Product Planning

Compaq's marketplace was characterized by short product life cycles, making fast development cycles extremely important. If a product was not right, it was usually too late to change it if problems were noticed after formal introduction. Canion characterized the battle for product success as a "game of inches": a difference of six months to market could make or break a product.

It was very important to match marketplace needs with technological possibilities. Canion said one of Compaq's differences was that "we believe you can determine beforehand if a product will be accepted, through the right kind of market research." For example, Compaq had held back while other companies introduced laptops, and had introduced its own only when the technology had progressed so that a true no-compromises laptop was possible. The resulting product, the SLT/286, was an instant success.

Canion said, "Compaq's planning is based on a product strategy team that merges strategic and product planning, focusing on where technology is leading. I spend a third of my time on strategic and product-planning issues. I can justify the time easily; the strongest thing in our market is to have the right product at the right time." Compaq had had a separate strategic planning group, but it was disbanded in favor of the product strategy team.

The product strategy team included Canion, Swavely, Harris, Gary Stimac (senior VP, systems engineering), and a few other top managers. They met Tuesdays and Thursdays for four

hours. Each meeting focused on specific ongoing, potential product development projects, which were considered in light of the key strategic issues facing Compaq. One or two key people from those projects attended the meeting as full participants while their projects were discussed. The product strategy team maintained a prioritized list of usually about 50 projects; priorities were reassessed periodically. Projects were funded when their priority was high enough for the marketing and development organizations to assign personnel to them.

Once a project was funded, project teams were formed. Marketing and engineering efforts for funded projects worked in parallel, and manufacturing was also involved early through a "design for manufacturing" philosophy, wherein members of a manufacturing liaison team participated in design reviews of new products right from the start. Approval of a development project did not mean the product would reach the market. Stimac said, "If we decide a project is a bad idea, we raise our hand early and make 'kill' decisions." He felt this had been a key to Compaq's enviable product success record.

Culture

Compaq's culture was based on a few ideas about how people act. The most important assumption was that people were inherently honest and would use every tool available to try to do the right thing. Trusting employees was also very important. The main cultural precepts of treating people with respect, trust, open communications, candor, and team spirit were consistent with these ideas. To help maintain the culture, Compaq tried to hire "nice" people, people with integrity, compassion, and a can-do attitude. Considerable resources were invested in finding the right kind of people.

Compaq's main rule for action and decisions was "do what makes sense" for Compaq as a whole, rather than focusing too closely on fixed goals, familiar solutions, or standard procedures. Bob Vieau, senior VP, manufacturing, commented that he guarded against the "it has always been done this way" syndrome and instead was a heavy promoter of "does it make sense today?" The whole idea was that "doing what makes sense prevents the system from getting you hung up in procedures."

The Process

The Process was the method Compaq used to make important decisions and to determine how to do what makes sense. The Process encompassed a whole range of ideas, including (1) the rule of inclusion, (2) teamwork, (3) "working the issue," and (4) consensus-building.

First, if the decisions and issues affected several groups, it was important that each group be represented and that everyone who could make a unique contribution to the issues at hand be included. Second, when a manager committed to do something, he committed for his team, and to work with the rest of the organization as needed. Team performance was emphasized over individual performance. Even when an individual had screwed up, that was secondary. The important thing was making sure the team succeeded.

Third, the idea of working the issue was to resolve an issue by gathering information, taking full account of the issue's impact on different areas of the company and thoroughly discussing different alternatives. As Canion said, "The more information you have, the more you

can work the issue." A key cultural precept was to speak up with any concerns, even if they were uncertain or vague, as long as there were reasons behind them. Senior managers were particularly concerned that all sides of an issue were carefully considered. Canion and Swavely acted as devil's advocates to ensure that competing alternatives were fully represented.

The fourth key aspect of The Process, consensus-building, often required repeated cycles of discussion, information-gathering, and working the issues. Sometimes everyone agreed on a course of action even though some were not in full agreement with every aspect. The senior person decided for the team only when this level of agreement could not be reached. The Process was meant to ensure that everyone felt their concerns and those of their group had been represented, and that everyone involved understood the decision and its issues, even when a consensus could not be reached. White said the key was that after the decision was made, "everyone marched in the same direction."

Following The Process sometimes meant it took a long time to reach the right decision. Pfeiffer recalled the time the entire international top management group and Swavely spent a whole day discussing only the top item on their agenda: the pricing of one new product. Nevertheless, Compaq executives felt it was almost always worth taking time to ensure that everyone understood the decision.

Open Communications

Open communications were a key element in all aspects of Compaq's operation. Canion said he could not overemphasize the importance of an open environment in stimulating candid feedback. John Gribi, senior VP, administration, thought communication in many large companies was limited and information was often hidden or camouflaged. Managers generally agreed there was a great deal of freedom to speak out at Compaq.

The open-communications ethic particularly stressed early notification of problems and "don't shoot the messenger." It was acceptable to have made a mistake, as long as you informed the appropriate people as soon as you recognized it. The ethic also stressed integrity of presentation, i.e., presenting the facts as they were rather than concealing or distorting them to advance a vested interest. By reducing game-playing with numbers, better decisions could be achieved, and destructive politics were kept to a minimum. Sharing of information was strongly encouraged. Swavely said, "Someone in international can request any piece of data--and ask us to explain it. Allowing others access to information requires a lot of trust, but that trust exists at Compaq."

Compaq's information systems helped provide an open-communications environment. Individuals could send a message directly to nearly anyone in the company via a worldwide network, including top management. The network was extremely active, and the importance of electronic mail (called B-mail at Compaq) in tying the company together was widely emphasized. But David Schempf, VP and corporate controller, did have a concern: "B-mail can be a trap, if it eliminates human face-to-face contact."

International Culture

The culture in Compaq's international operations was largely similar to that in the United States. But the culture took more time to assimilate internationally, due to the dispersed nature

of Compaq's international operations, differences in each country's indigenous business practices and customs, and the necessity for integrating those practices and customs with Compaq's own culture. Compaq depended heavily on individual country managers to spread the culture as well as to attain business success.

Maintaining the Culture

When asked what was most important for Compaq's continued success, managers always mentioned maintenance of the culture first or second. And maintaining the culture by leading by example was mentioned often. Senior managers felt that setting an example of how The Process worked was particularly important in meetings when problems in process arose. To do this, a manager had to be willing to stop the meeting and discuss the process by which the meeting itself should be conducted.

Opinion varied on how difficult it would be to maintain Compaq's culture. Canion felt the period of greatest risk to the culture had been when Compaq went from hundreds of people to thousands. It had been growing so fast that at one point 79% of the people had been with the company for less than a year. But Harris felt it had been relatively easy to maintain the culture during fast growth and that it might become more difficult to maintain as growth slowed. Canion had held several top-level meetings to find ways to maintain the culture as Compaq grew.

Finance Function

The challenge in a fast-growth environment was to achieve a balance: to have appropriate systems in place, but not to impose too many policies and procedures that made the system inflexible. Compaq's financial policies were designed to avoid overcontrol, but to have information available when needed.

Compaq had had sophisticated financial controls from its inception. Gribi, Compaq's first CFO, had drawn on his experience at Price Waterhouse and TI and set up the financial-control systems to handle a *Fortune* 500-size company. In 1982 he had brought in an integrated financial software system (called ASK), which provided material requirements planning, procurement, sales, order entry and processing, and corporate accounting applications. Later versions of ASK were still in use across Compaq in 1990.

Financial staff contrasted their role at Compaq with what they believed were traditional norms. For example, White discussed the financial stereotype of the operating manager. "This manager can't be trusted, so financial procedures and controls are required. Finance becomes responsible for monitoring ever-increasing numbers of controls, many of them overly standardized to make finance's job easier. But any good operations manager can and will get around controls if necessary. After a while, finance is viewed as a spy, and financial policies are seen as hurdles." Several executives believed that unreasonable controls led to "gaming" of systems and could also slow down the company's reaction time and demotivate people.

Compaq's philosophy of the finance function was to help managers maintain control of the business, but not hold it up. For example, Gribi often stressed that all finance staff must view themselves as a service organization. Rather than being judgmental or adversarial, finance could ensure that appropriate and necessary controls—but only those needed—were in place. White

even felt that such control could be the opposite of constraint. It could help enable consistent, strong growth. The idea was "to get behind and push in the right direction." Finance could help managers by focusing on business issues, ideas, and concerns instead of just crunching the numbers.

Finance staff were assigned throughout Compaq as full members of cost-center business teams. They attended all key staff meetings, participated broadly in business decisions, and contributed in all areas, even product features. The finance representative raised financial issues for discussion, but in the context of the business issues at hand. This allowed appropriate controls to be in place without managers viewing them as outside interference in "their" business.

The finance staff formed a network of people who "have their fingers on the very pulse of the business. I have the best grapevine in Compaq," White joked. Because of their network, finance staff acted as communication links and coordinators across the various functions. Further, the flow of financial and business information up the hierarchy was ingrained in the very process of Compaq's operations. This helped make it possible to have only a limited number of regular formal reports. White could always use his networked PC if he needed more detailed information.

The key integrating meeting for the finance function itself was the monthly Corporate Forecast Review, attended by 15 to 20 top financial staff. Financial staff at international headquarters "attended" by phone for much of the four-hour meeting. Senior staff presented a corporatewide perspective on current financial and business issues, and issues specific to the finance function were discussed and resolved.

White summarized Compaq's view of financial control by citing the false dilemma of "who should the controller report to?" He thought the controller needed broad involvement and had to be a full member of two teams: the cost-center business team and the financial team. Who the controller reported to was less relevant. In fact, finance was thinking of moving financial staffing costs out to the line organizations.

Cost-Center Management and Finance

The view of finance as a true support organization dovetailed closely with Compaq's philosophy of managerial responsibility. The basic idea was that authority and responsibility should go to the manager making the decisions. The cost-center manager was trusted to make major decisions for the business unit.

With authority to make decisions came responsibility for them. Cost-center managers were responsible for their unit's business performance—particularly the financial measures of its performance. They "owned" the numbers and presented them to their management. Cost-center managers had to be ready to explain the numbers and their impact on current programs and future performance. This made for particularly quick decisions, since managers were able to quickly understand relations between business alternatives and financial implications. (By contrast, in companies where the financial staff was responsible for and presented the numbers, White and Gribi thought managers had little knowledge of the numbers.) Working closely with the cost-center manager, the finance person on a manager's business team helped interpret the consequences of the cost center's business decisions, especially as related to Compaq's broad financial goals.

Top management took a relatively hands-off approach to most individual cost-center financial matters. The major areas they were directly involved in were decisions that were unalterable or that truly changed Compaq's financial position. For example, at Canion's weekly staff meetings, White presented financial updates that focused on the overall financial situation and key trends rather than individual cost-center performance.

Financial Forecasting

For Compaq, financial forecasting extended out only one year. Although longer-term planning was done for broad product strategy and facilities expansion, Compaq did not set detailed financial targets beyond one year because experience had taught that the business changed too fast for such planning to be meaningful. Financial forecasts were revised every month. Recent events in technology, markets, manufacturing, and operations were evaluated, and the forecast was brought into line with them. Frequent forecast revisions were forced by fast changes in Compaq's business. As Swavely said, "The only thing I'll guarantee you about the forecast is that it is wrong." Compaq also had an annual planning process, but it was better considered as an adjunct to the monthly planning process rather than entirely separate.

Monthly Forecasting

The major steps in the monthly forecast revision are shown in **Exhibit 4**. Compaq's "product road map" detailed new products and introduction dates and was frequently updated, as part of product planning. Product specifications and expected introduction dates were quite firm in the near term (six months or less) and became less so beyond that.

The product road map and the current sales performance were used along with extensive industry competitive and market data to produce the demand forecast, which broke down expected sales by month and model. Demand forecasting was done on a rolling 12-month basis. Each month the 12th month out was added to the demand forecast.

The demand forecast was critical to Compaq's operations. If it was too aggressive, inventory would quickly accumulate. Forecasting conservatively had its own dangers: if sales and marketing based their staffing and spending on conservative demand estimates, they might not have the resources to achieve the maximum possible sales. Or if demand came in above the (conservative) forecast, manufacturing might not have the resources to meet that demand.

The demand forecast was built on a combination of extensive information and the judgment of Compaq managers. Current sales performance was a particularly important input. Field sales personnel entered dealer orders into the ASK system daily. Throughout each month, Swavely, his staff, and the financial staff monitored performance and assessed current and likely future demand conditions. They focused particularly closely on the performance of Compaq's top 25 dealers, who made up 90% of sales.

Information from all sources was brought together each month at the "demand forecast issues" meeting, where 15 to 20 people from across Compaq examined that month's issues. These ranged from market research on dealer sales and inventory levels to competitive new-product introductions and pricing changes. Meeting participants often challenged each other about the implications of issues and events. The issues meeting was meant mainly to develop baseline

assumptions for the next step, the demand forecast finalization meeting. Teams were formed at the issues meeting to further investigate questions that could not be resolved in the meeting itself.

The finalization meeting was held two days after the issues meeting, with slightly fewer participants. The sales organization would have put together a provisional demand forecast to use as a starting point, based on the results of the issues meeting. At the finalization meeting, product demand estimates were adjusted based on the most up-to-date information and judgments Compaq could gather.

The demand forecast became the main input to manufacturing, which revised the "build plan" every month. The build plan specified production levels by model and month for each manufacturing facility.

Product pricing and product costs were also forecast for the period covered by the demand forecast. A small team of marketing and finance staff drew on Compaq's formal price change approval system, market and competitive analyses, and product introduction plans to develop pricing forecasts by model and month. The unit cost forecast, specifying expected costs for each model in each month, was closely linked with the build plan. Finance coordinated development of this forecast with the help of purchasing, engineering, manufacturing, and marketing. The forecast incorporated expected cost changes, such as component pricing reductions.

The product road map, strategic objectives, build plan, and demand forecast were all used by different cost centers for financial planning. Each of the 400 cost centers estimated its requirements to meet both strategic and its own "baseline" objectives. Strategic objectives were set by top management; for example, Compaq was implementing a companywide Total Quality Commitment program in 1990. Baseline objectives were the daily routine tasks the cost center was charged with. Cost-center resource requirements were broken down by month into detailed categories, including expected capital expenditures. Cost-center planning used Lotus 1-2-3 spreadsheets as what-if tools and Microcontrol networked planning software as the main data collection and transmission tool.

Finance consolidated cost-center forecasts using Microcontrol software, which also had provisions for easy collection and consolidation of Lotus spreadsheet data. The consolidated forecast used less detailed categories than individual cost-center forecasts. Finance combined the consolidated cost-center forecasts with expected revenues from the demand and pricing forecasts and with expected manufacturing costs from the build plan and unit-cost forecast. The result was projections for the income statement and some key balance sheet lines.

Compaq executives shared beliefs about appropriate target levels of expenses in broad categories like G&A, R&D, marketing, and sales, as well as appropriate profitability levels. These beliefs, developed through their extensive experience in the industry and at Compaq, summarized their conception of how the business should be run and were formalized as a "financial model" in which the targets were expressed as a percentage of revenues. The target expense and profit levels had historically changed with the business environment. For example, beliefs about the appropriate level of R&D expenditures had gradually been revised upward as products became ever more complex.

Financial projections were compared against the financial model, with the key targets being the gross margin and the profit-after-tax percentage, and the projected earnings per share. Measures like ROI or ROC were not used at this overall level, for managers were convinced these measures were ineffective in a fast-growth environment like Compaq's.

If financial projections were not within acceptable ranges on key targets, they were adjusted. This process started with members of Canion's team, who worked the issues within their own unit to determine what tradeoffs were required to reduce expenses. Some expense reductions could usually be made without putting Compaq at significant risk. If target percentages could not be met this way, the whole top management team discussed the issue. For example, if Swavely asked his managers to cut $8 million, he would also ask them, "Tell me what you have to do that's stupid." If the cuts required did not pass this "do what makes sense" test, he would not ask his managers to make them. Instead, he would bring the issue back to the full top management team. Another function might be able to make up the shortfall. Alternatively, the financial forecasts could be approved, knowing that the target percentages would not be met. The decision would be made to consider this an "investment" period, during which lower returns would be accepted temporarily.

Annual Planning

This process involved gradually extending the time horizon of the monthly forecasts, so that by January of each year an annual plan for the year was completed. Annual planning started in June. By then, the demand forecast extended through the first half of the next calendar year, for it was done on a true rolling-12-month basis. But the build plan and cost-center forecasts were done on a calendar-year basis, so they would be projected only to the end of the current calendar year. In June the build plan and cost-center forecasts were extended to incorporate the first quarter of the next calendar year, and in July, the second quarter. By September, preliminary forecasts of the entire next calendar year had been made. The discrepancy in time horizons between the demand forecasts and the build plan/cost-center forecasts was at times inconvenient; moving the latter to a 12-month rolling basis was being considered in early 1990.

Early in January of the new year, the annual plan was completed and fixed. After that, the plan was used mainly within the financial function as a stable base to compare against as the year developed. The monthly forecasts, not the plan, were the main management tool.

Forecasting versus Budgeting

Canion said everyone understood the financial forecast was more of a starting direction than a fixed goal. Keeping things balanced as events changed was critically important. As forecasts changed each month, management made changes at whatever level was appropriate: strategy, product programs, marketing and sales programs, staffing, or even capital spending.

White emphasized that to call the financial forecast a budget was misleading, for a budget implied a fixed constraint. For example, cost-center forecasts were forward-looking control mechanisms, simply a manager's statement that "this is what I will do," and were subject to revision. Finance staff were less likely to consider the forecast a budget than were operations staff, who tended to say they had a budget while acknowledging that it changed as needed. There was no formal comparison against last year's performance internally.

Flexibility through Forecast Revisions

Although the monthly revision was time-consuming, it helped Compaq respond to market changes quickly and flexibly and had given top managers a very sophisticated, measured understanding of the business. White, Schempf, and other financial staff monitored overall progress against the forecast almost daily. A sophisticated what-if model enabled quick estimation of current performance's effects on financial forecasts. The model contained a projected income statement, balance sheet, cash-flow statement, and key indices and ratios; it was updated as soon as information was available. Information was gathered from many sources, including weekly status meetings in various functions, pricing actions, and demand-forecast updates from weekly sales-status meetings.

Results from the what-if model were constantly reviewed with an eye to action. Variances against the forecast were analyzed particularly carefully, with the critical question being: was this a one-time anomaly, or was a new trend emerging? White reported findings and concerns to the management team at Canion's weekly staff meetings, allowing them to react intelligently to events almost immediately.

For example, unforeseen circumstances during the fourth quarter of 1989 resulted in sales significantly below forecast levels. The decline was not evident until the start of the quarter's second month. White worked with top management to reduce expenses successfully without harming the business. As a result, Compaq came far closer to meeting its profit goals than would otherwise have been possible.

But Canion emphasized he would not go too far just to reach financial goals. Even if forecasts were not being met, it was important to maintain Compaq's consistency in decisions and to safeguard its image and "tone." Top management would act after considering both these factors and financial goals. For example, they might accept temporarily lower profit margins during development of a new product if they felt it would improve the company's long-term health, instead of simply reacting with an austerity program aimed at narrow cost-saving goals.

Different Approaches to Financial Control and Measurement

Individual top managers used financial controls and treated financial measures in different ways. Canion himself looked at only a very few financial measures. He relied on White to present important financial information and issues at Canion's weekly staff meeting.

Swavely "managed to the forecast," since performance against the demand forecast was an appropriate measure for his sales teams. Expenses were managed to a percentage of conservatively judged revenues; the level of "judged" revenues was based on a somewhat lower sales level than that in the demand forecast.

Swavely viewed the financial organization as "the glue that holds Compaq together," rather than as a constraint. For him, current financial data were the "backbone," which along with up-to-date market and competitive information was key to making specific decisions. He carried a quick-reference binder filled with information to every meeting (see **Exhibit 5**); other senior managers had similar binders.

Vieau called White and the financial function "the conscience" of the business. White and the financial people in Vieau's group checked if manufacturing was meeting financial expectations; if it was not, they gave "guidance." The manufacturing business team took this information and did its best to adjust its plans. But cost was only the fifth of manufacturing's priorities (see **Exhibit 6**).

Financial controls were least complex in the engineering functions. Stimac in systems engineering used headcount and development project priorities as his main measures, since most of his other expenses were directly related to them. Harris in engineering relied on finance staff to let him know about problems; when there were none, he focused on product development.

International Financial Controls

The geographically dispersed nature of Compaq's international operations led the headquarters staff to emphasize financial procedures and controls somewhat more than in the U.S. International headquarters was farther away from the countries and could not take corrective action as quickly or easily.

Compaq's international financial forecasting process was similar to that used in the U.S., though the target expense percentages were more formally specified. Each country subsidiary's forecasts were compared against the target percentages individually. Larger, more mature subsidiaries were expected to have lower expenses, on a percentage-of-revenue basis. Andreas Barth, managing director, Central Europe, stressed that for him the most important number in the financial model was the total expense percentage he was allowed. As long as he met that target, he felt he was basically meeting expectations.

The forecasts were consolidated in Munich. Before sending them to Houston, Pfeiffer made his own judgment of them, increasing or decreasing the overall demand projections.

Performance Measurement

Canion described Compaq's performance measurement as being "almost the opposite of an MBO [Management-By-Objectives] system." He treated numbers and concrete results as a starting point and tried to understand the driving forces at work. Performance measures were intentionally not that objective. Canion believed this helped managers maintain a broad vision and prevented them from "optimizing their personal goals rather than the company's." He believed working closely with people was the key to developing the knowledge necessary to make this approach work.

By not focusing too closely on results as such, Compaq tried to encourage people to be innovative and to do what makes sense. Whether Canion was dealing with a failure or a success, he tried to analyze the results the same way. It was almost more important for the proper process to be followed than simply for goals to be met.

Vieau said Compaq asked extraordinary things of its people, so if people failed to meet goals, they were not punished. When a project failed, his question was "Did we do all that we could?" If the answer was yes, a "project should not feel like it was a failure."

Vieau also felt that commitment, not goals, led to achievement: "Goal attainment is deemphasized a little. If we had set more goals, I don't think we would have been so successful. A goal of $20 million in sales in 1983 would have seemed unrealistic; instead we made $111 million through commitment and following our process." Canion felt it was important to keep a feeling of success; he preferred to have realistic goals rather than extremely aggressive ones. White said Compaq limited "sandbagging" (presenting too easily achieved forecasts) by deemphasizing simply "making your numbers" and by revising forecasts monthly. He was adamant about the particularly high importance of this: "If someone was to 'sandbag' and so the company spent less elsewhere, it would be unconscionable." It could also disrupt information sharing and teamwork, which were central to Compaq's operations.

An important part of each manager's performance assessment was their own ability to manage according to cultural precepts, and how well they were training their people about the culture and its processes. The culture's emphasis on team performance was also evident. When asked, "How do you know you are doing a good job?" most managers first talked about how they knew whether their team was doing a good job; several said separation of team and individual performance was very difficult.

Compaq's formal performance appraisals varied in format and importance across different functions. For example, Stimac asked his reports to rate their five weaknesses and five strengths and to rate themselves on performance toward quarterly goals. Stimac rated his reports the same way; then he and the manager compared the ratings.

Internationally, measuring performance had been quite difficult. The country subsidiaries had consistently exceeded their goals. Pfeiffer said it was hard to criticize a country manager—whose main goal was a sales target—when that target had been exceeded by a considerable margin. Like Canion, Pfeiffer tried to get beyond numbers. In particular he focused on ascertaining whether a subsidiary was being managed consistently with Compaq's culture and procedures, in addition to meeting its sales targets.

Compensation

Compaq set salaries using job grades in relatively standard fashion. The goal was for Compaq's pay levels to be in the top quartile of industry pay averages. It also had an annual cash bonus system. Bonuses were drawn from a corporate pool, the size of which was determined by profitability and comparison with other companies' bonus policies. Again, the goal was for Compaq to be in the top quartile in the industry. Compaq's growth and profitability had allowed the bonus pool to grow consistently.

Bonuses were based on individual performance, contribution (the impact of an individual's actions on company performance), and position. They could be a significant portion of the annual salary of some managers and key individual contributors. Half the bonus was based on performance during the past year, and half on future potential. The idea was to reward both current and future talent and key long-term managers. Basing the bonus on position and contribution allowed it to grow as an individual's capabilities grew.

Stock options were also perceived as very important for motivating a long-term growth perspective. The idea was for people to start thinking of Compaq's money as their own. Every

employee received a stock option package, with the size and frequency of awards being based on salary, position, contribution, and potential. Gribi said that if you included stock options, "you won't find a better total compensation package than Compaq, anywhere." The return on the stock had been exceptional (see **Exhibit 7**).

The salary, ranking, and bonus systems used internationally were all similar to U.S. ones, although cross-country equity in compensation was an important additional consideration.

Interestingly, Compaq's top management often deemphasized the importance of compensation and incentives. Several said it was important that pay levels and bonuses be perceived as fair, but Stimac summarized the prevailing view: "Once a certain level [of overall pay] is achieved, financial incentives have a diminishing return." Working with good management, having fun, and personal accomplishments were all mentioned as additional important reasons people enjoyed coming to work each day.

Looking Forward

Compaq faced several challenges in early 1990. The overall U.S. PC market was maturing, with market growth expected to slow to less than 10% in 1990, although growth in the international market was expected to continue at a faster pace for some time. Compaq had also attained such size and market share that growth rates would inevitably come down from historical levels. But Compaq's growth was expected to still be faster than overall PC market growth, due to its participation in high-growth segments of that market.

Canion was upbeat. He believed Compaq would still have considerable room to maneuver within its traditional markets, using the dealer channel. He thought the most important challenges would be internal. Several top managers, including Canion himself, had said that one of his most critical roles was as Compaq's "conscience." He was constantly looking for things that might go wrong. His concerns were evident as he assessed Compaq's challenges in early 1990: "The number-one lethal disease is the overconfidence that comes with success. The biggest danger is to stop looking back, to stop understanding the real reasons for our successes." Improper analysis of success could lead to "assumptions that become 'killers' down the road." It was critical that people not stop looking back, that they continue to examine why a particular project was successful and why another failed. For Canion, the key was hard work and maintaining consistency, knowing what was going on at all times. For him, Compaq's business had been, and would remain, a "game of inches."

Exhibit 1 Sales Growth

	1983	1984	1985	1986	1987	1988	1989
Sales (millions)	$111	$329	$504	$625	$1,224	$2,066	$2,876
Total assets (millions)	121	231	312	378	901	1,590	2,090
Percent of sales international	0%	5%	10%	19%	26%	39%	45%
Sales	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Cost of sales	72.4	70.6	64.7	57.7	58.6	59.7	59.6
Gross margin	**27.6**	**29.4**	**35.3**	**42.3**	**41.4**	**40.3**	**40.4**
R&D	3.3	3.3	3.2	4.3	3.8	3.6	4.6
Marketing & sales expense	10.3	12.8	13.5	15.3	11.7	11.4	11.6
General & administrative	9.7	7.3	8.4	9.0	6.8	7.8	7.2
Other	-0.2	1.0	1.7	1.5	0.5	-0.3	0.2
Total operating expense	**23.2**	**24.4**	**26.7**	**30.1**	**22.8**	**22.5**	**23.5**
Income before taxes	4.4	5.0	8.7	12.2	18.6	17.8	16.9
Employees (at end of period)	615	1,318	1,860	2,200	4,300	7,000	9,500

Discrepancies in tallying are caused by rounding.

Exhibit 2 Brief Product History

01/83	- Portable	- Shipments grow from 200/mo. in Jan. to 10,000/mo. in Dec.
01/84	- Portable Plus	- Adds hard disk (expanded storage) capability to portables
06/84	- Deskpro	- 1st Compaq desktop; helps Compaq triple sales in 1984
04/85	- Portable 286	- First portable to use 80286[a] processor
04/85	- Deskpro 286	- Led Compaq to #2 in 80286-based systems sales in United States
02/86	- Portable II	- Compaq's best-selling product within 5 mos. of introduction
09/86	- Deskpro 386	- Compaq was first major manufacturer to introduce a microcomputer based on the new 80386 processor
02/87	- Portable III	- Best-selling, full-function portable in the world in 1987
09/87	- Deskpro 386/20	- Fastest, most powerful PC in the world at introduction
09/87	- Portable 386	- Most advanced, full-function portable at introduction
06/88	- Deskpro 386/25	- Successful follow-on to Deskpro 386/20
06/88	- Deskpro 386s	- Used economical 80386SX processor. Compaq's best-selling product in 1989
10/88	- SLT286	- Laptop computer. Captured 40% of domestic laptop market within 6 months
Late '88	- EISA Standard	- Compaq helps form industry alliance to establish the Extended Industry Architecture (EISA) as an alternative to IBM's proprietary Microchannel architecture
04/89	- Deskpro 286e	- Continued development of line; better integrated, sleeker
05/89	- Deskpro 386/33	- Successful follow-on to Deskpro 386/25
10/89	- LTE/286 & LTE	- Notebook computer. Most orders in first 3 months of any Compaq product to date
11/89	- Systempro	- Power comparable to DEC VAX minicomputer; 80386 and later 80486 processor; Compaq's first EISA product
11/89	- Deskpro 486/25	- Most powerful desktop PC in world at introduction

[a]The processor is the "brain" of the microcomputer. The type of processor (80xxx) determines how powerful the microcomputer is. The 80286 (also called the 286) replaced the slower 8086 & 8088; the 80386 (the 386) was yet more powerful; and in 1990 the 80486 (the 486) processor, the most powerful yet, was just coming into general use. To add to the complexity, each processor had different versions that ran at different speeds or had somewhat different capabilities. On some of Compaq's products (i.e., the Deskpro 386/20) the processor number is followed by a slash and a second number, which indicates the clock speed in megahertz (faster is better).

Exhibit 3 Organization Chart

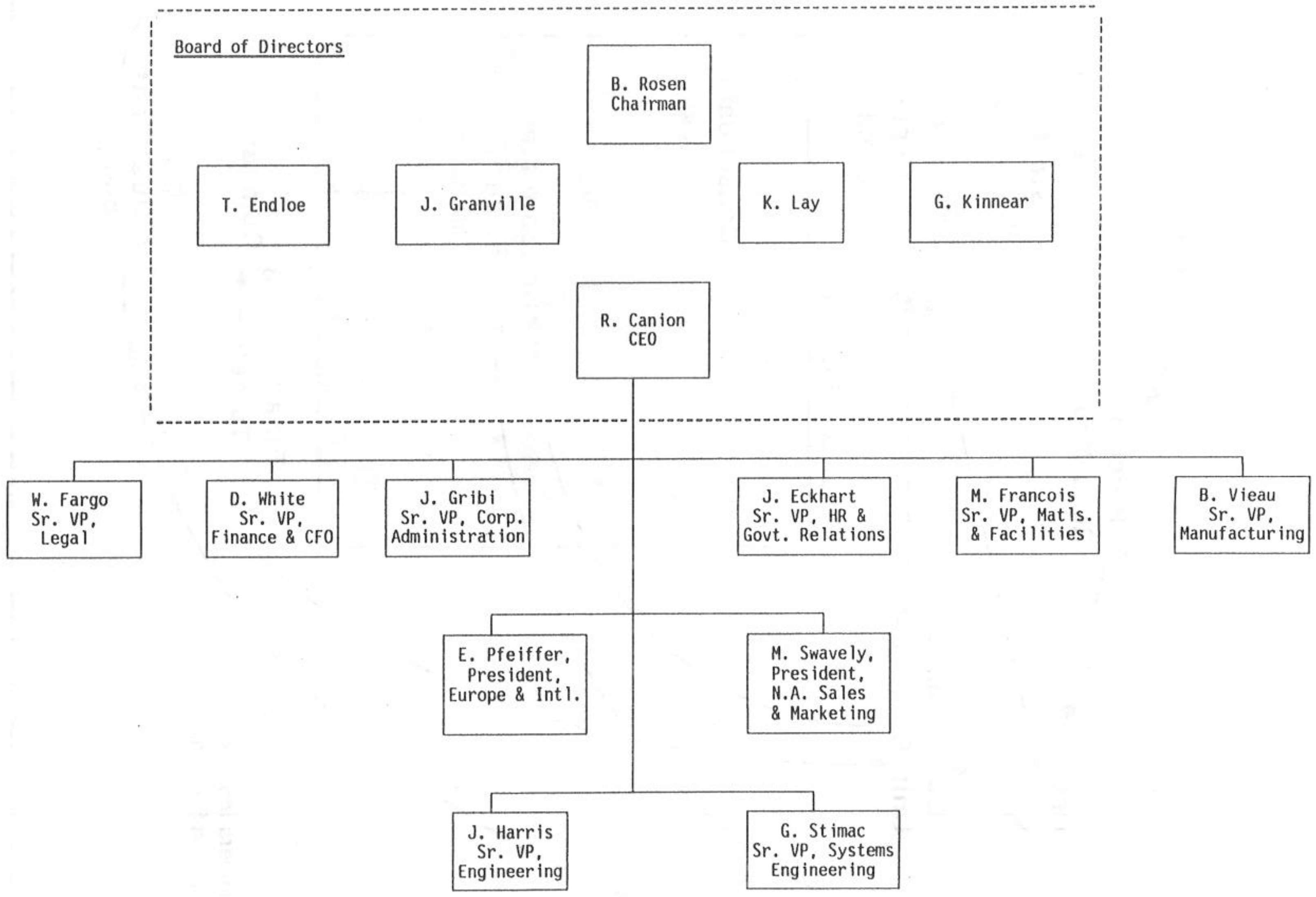


Exhibit 4 Monthly Forecast Revision Process

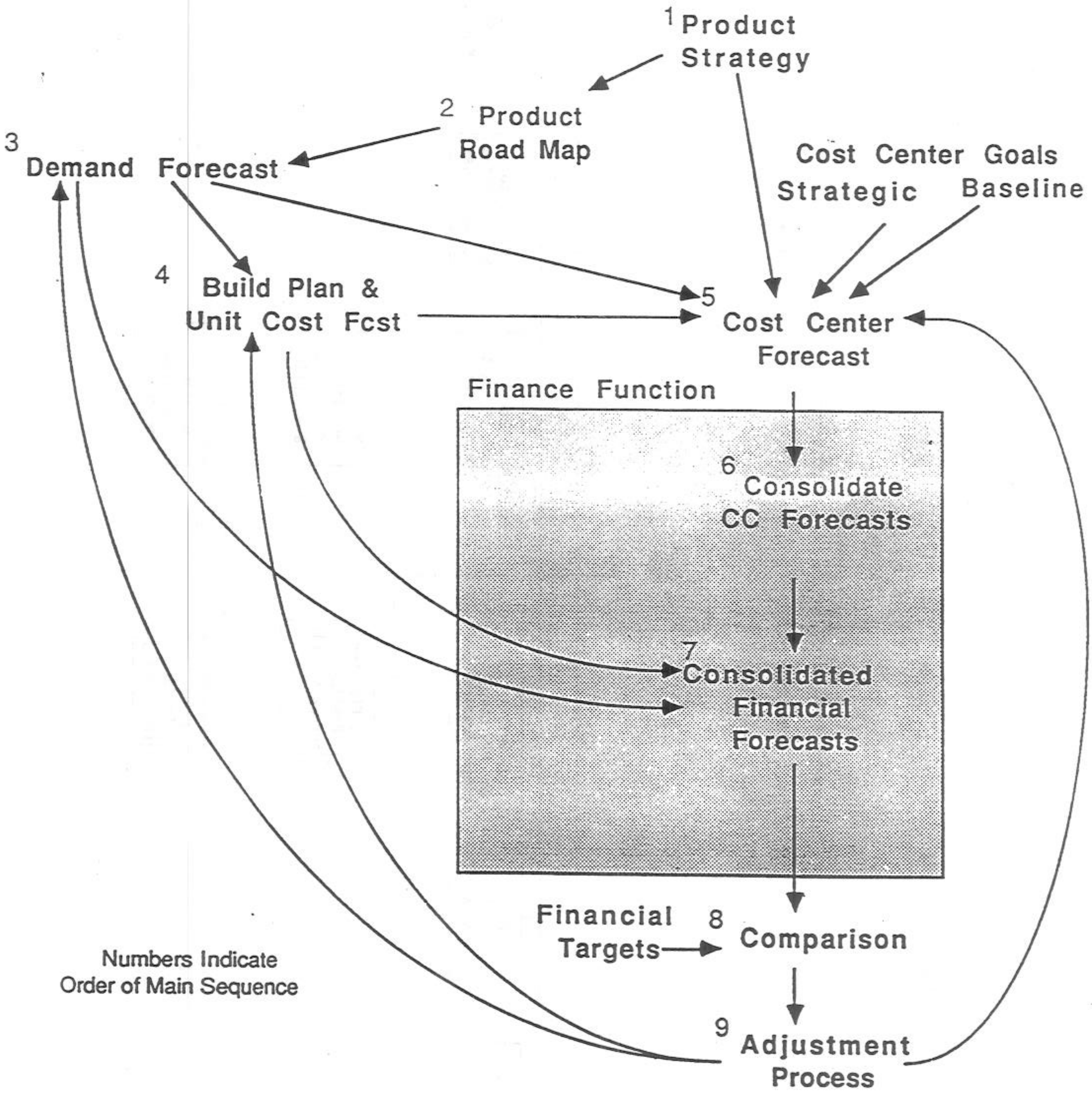


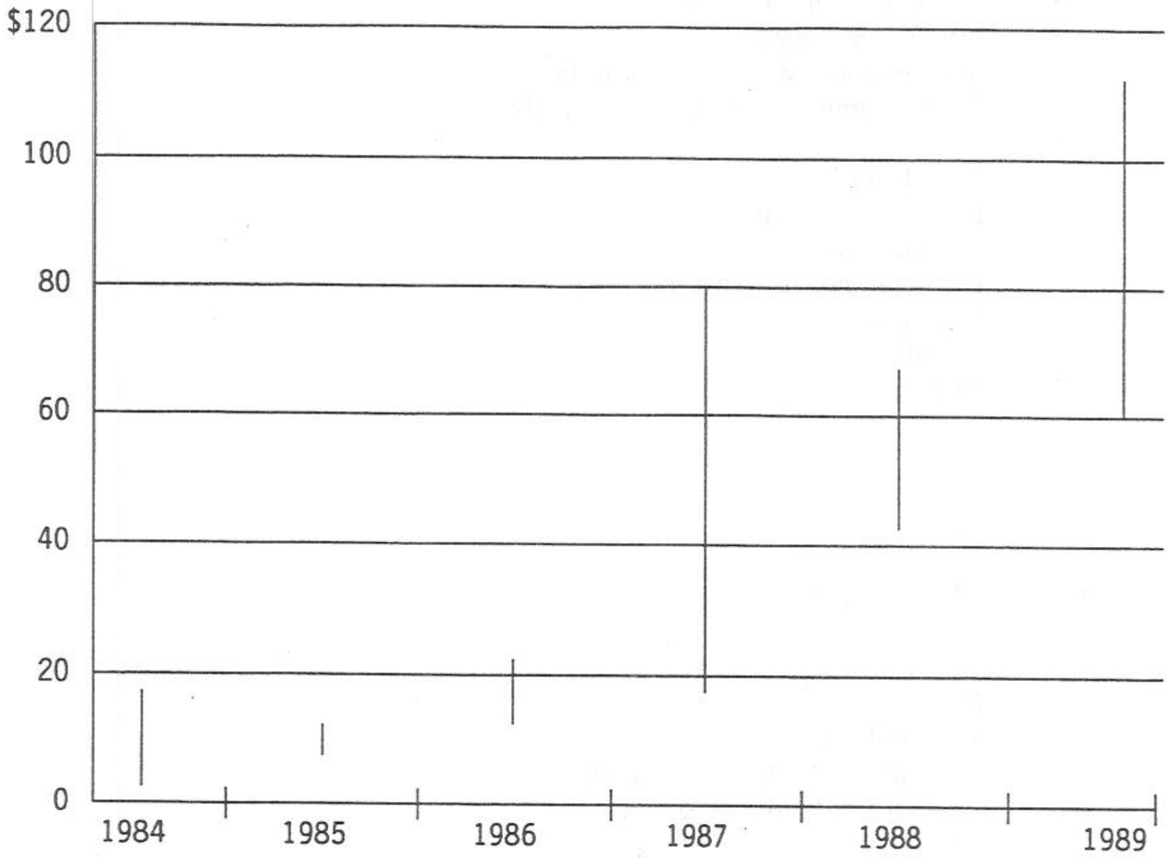
Exhibit 5 Swavely's Quick-Reference Binder Sections

- Expense and people forecast
- Financial data (P&Ls)
- Storeboard (market research)
- International data
- Market share, size, and growth data
- Sales, inventory, and channel analysis
- Demand forecast
- Price forecast
- Product road maps
- Weekly staff reports
- Financial models (what if?)
- Press releases
- Canada
- Service

Exhibit 6 Manufacturing Priorities (in order)

1. Product quality
2. Short delivery cycle
3. Short product introduction cycle
4. Flexibility for mix changes
5. Product cost
6. Flexibility for volume change
7. Asset use

Exhibit 7 Compaq Stock Prices, 1984-1989 (Bars indicate high & low for year)



21

WHARTON REPROGRAPHICS

Growing Concerns

Milestones for successful venture planning

Zenas Block and Ian C. MacMillan

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Growing Concerns

Topics of particular interest to owners and managers of smaller businesses

Edited by
David E. Gumpert

Milestones for successful venture planning

Zenas Block and Ian C. MacMillan

Entrepreneurs draw up business plans for new ventures to make various marketing, pricing, financial, and other projections. More often than not, though, their estimates bear little relationship to reality. These authors argue that planning for new enterprises differs fundamentally from planning for existing companies, given the inherent instability of start-ups. How can managers launching new ventures plan effectively for the many unknowns they will encounter? Identifying milestones over the project's life enables planners to both learn from experience about the enterprise's viability and make adjustments in strategy and goals as necessary. The authors describe ten typical milestones that new businesses pass, including concept and product testing, first financing, market testing, production start-up, and competitive reactions. At each stage, executives must match their assumptions with actual outcomes and determine whether and how to proceed to the next milestone.

Messrs. Block and MacMillan are professors of management at the Center for Entrepreneurial Studies at New York University's Graduate School of Business. MacMillan, who is also director of the center, published a previous HBR article, "The Politics of New Venture Management," which appeared in the November-December 1983 issue. This is Block's first contribution to HBR.

Starting a new business is essentially an experiment. Implicit in the experiment are a number of hypotheses (commonly called assumptions) that can be tested only by experience. The entrepreneur launches the enterprise and works to establish it while simultaneously validating or invalidating the assumptions. Because some will be dead wrong and others partially wrong, an important goal of the business plan must be to continually produce and build on new knowledge. Managers must justify moving to each new stage or milestone in the plan on the basis of information learned in the previous stage.

Learning in an evolutionary way is valuable not only for venture managers but also for investors, senior corporate managers, and directors. It can help them make informed decisions about whether to fund each stage, as indications of the business's potential unfold. They can use our milestone approach to measure management performance by examining what has been learned and how effectively the venture planners have modified plans to respond to new information—rather than use projections versus performance as the measure.

Milestone planning is hardly new. Traditionally, though, such forethought relies on predetermined dates set for reviews or project completions. The problem with date milestones is that they are totally unreliable for new ventures. Therefore, we suggest that managers make financing decisions instead as events are completed, using what they have just learned to make go, no-go, or redirection decisions. Obviously, new enterprises may need some deadlines and constraints. For instance, a recent proposal for a health and indoor tennis center included a completion date that would allow the club to open for the coming winter season. Every milestone was linked to meeting this deadline.

For most ventures, however, significant events—not dates—should determine milestones. The only hard dates in the plan should be externally imposed, for example, by factors like contract agreements or competitive pressures.

This approach to milestone planning has three advantages for enterprises:

1. It helps avoid costly mistiming errors.
2. It gives logical and practical milestones for learning and for reevaluating the entire venture.
3. It offers a methodology for "replanning" based on a growing body of ever harder information.

Writing the plan

To give an event milestone maximum learning value, the business plan must define the event's completion so that managers can test any assumptions they make. For example, a plan would not read:

"Milestone—completion of product development."

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A better, more specific statement would be:

"Milestone – completion of product development. Completion of a prototype machine that costs no more than $150,000; that can be manufactured for a direct cost of $12,000; that can produce 40 widgets per minute at 30 cents per widget; that the FCC will approve; and that high school graduates can operate with three days of training."

As planners reach each milestone, they can compare results with the detailed specifications to ascertain whether their original assumptions still hold. Then they can use their experience to make decisions about the next steps.

As an example, suppose you are managing the project we have just described and you learn after completion of product development that the assumptions appear well founded except that the direct cost will be $30,000 instead of $12,000. You know that you need to find out how you can change the price. Is there still a market at another price? Do you continue the project, redirect it, or abort it? How does the new target market differ from the one you originally projected? Does the prototype have any other features – negative or positive – you had not anticipated? How will you go about changing your plan? What will the changes teach you?

Few entrepreneurs use such planning for their new ventures, explicitly mapping out a sequence of events. More common are the horrifying consequences of not planning thoroughly: the attendant mistimings, heightened cash-flow burn rates, and the accumulation of losses.

Obviously, all enterprises are different, and while every event in a product's history can teach something, our experience suggests several important milestones that are likely to be most significant. We describe them in this article, and for each important event, we ask appropriate questions and offer lessons based on actual cases.

Milestone 1 – completion of concept and product testing

This stage has a very low cost relative to future steps and precedes complete product development; indeed, it often comes before any product development at all. This phase's purpose is to determine whether to proceed with any further development. At this point, planners consider whether a real market need exists for the product as they have conceived it or the model they have developed, or whether it has a potentially fatal flaw. At this milestone, entrepreneurs may have discovered a different opportunity as the result of testing their original concept and changing it.

The concept testing challenges assumptions made about desired product characteristics, target markets, pricing range, and perception of need. Planners need to ask themselves the following questions:

Have we confirmed that an opportunity exists with sufficient upside gain to warrant the necessary risks and costs?

What has this test taught us that modifies our assumptions and therefore, possibly, product development objectives and target markets?

Concept and product model testing are probably the least expensive ways of avoiding costly failure if planners link product development decisions to results. While some actual product development, production, and test marketing may appear cheap enough to warrant eliminating this stage, it has tremendous value as a safeguard against self-delusion and as a source of alternative opportunity identification in every situation.

For example, long before starting development work, entrepreneurs in a word processor venture in the 1970s identified through interviews with potential users highly desirable characteristics for the processor. They then looked at important target markets with special programming needs in law firms and government agencies. Long before they initiated expensive microprogramming efforts, the founders radically revised the initial product concept, based on the research results, to be a software product rather than a combined hardware-software product.

Milestone 2 – completion of prototype

Entrepreneurs can obtain much useful information from carefully analyzing prototype development. They must look carefully at what caused roadblocks and disappointments and how they overcame them; the seeds of significant, hidden opportunities lie in the creative solutions to these frustrations.

For example, the software programmer in one venture to develop a specialized, interactive information retrieval service eventually had to work out some radically new programming procedures to overcome a serious data-searching bottleneck. When the entrepreneurs looked for lessons in the situation, they realized they had an important invention on their hands. They are now patenting it. The invention's profit potential is ten times greater than that of the original business, and developed at a fraction of the cost.

To apply lessons from prototype completion, entrepreneurs must answer the following questions:

What assumptions did we make about development time and costs and how have they changed? Why?

What impact have those changes had on our plans and timing with respect to new hires, plant construction, marketing, and so forth?

How do they affect financial needs and timing?

What have we learned about labor, material, and equipment availability and costs and how does this affect our pricing plans?

Do our observations and assumptions about our target markets still hold? If not, how have they changed, and how will the changes affect our plans – objectives, timing, and resource utilization – for each succeeding event?

Do the product's characteristics fit with the original concept and plan? Does this create any new opportunities? How should we modify our actions as a consequence?

Are our assumptions regarding significant competitors and com-

(6)

petitive product characteristics still valid?

How should we revise our investment requirements?

Are our projections about important suppliers and service distributors still valid?

If planners expect product development time to be lengthy, they may find it useful to divide development activities into submilestones for review.

Milestone 3 – first financing

Whether the first outside financing is for seed money to test the concept's potential, start-up financing for product development and market testing, or first-stage financing to initiate manufacturing or sales, the entrepreneur must understand how investors perceive the venture.

Businesses must compete in the capital as well as product markets to survive. Entrepreneurs should view securing financing as an opportunity to learn about their ventures' acceptable financial and expense structure in view of the highly competitive financial market.

For example, a publisher seeking funds for a new magazine soon learned that investors objected to her plan because she had budgeted for the purchase of a large piece of capital equipment. In a revised plan, she budgeted for leasing the equipment at conventional rates; once again she encountered resistance. Eventually, she persuaded a supplier to *lend* her the equipment for the first nine months of operations. This favorable assist to cash-flow projections, along with her determination, enabled her to secure the funding she needed. What was important in this case was that she treated each rejection as an opportunity to ask why the plan had been turned down, and she learned what investors considered to be an acceptable financial structure.

Milestone 4 – Completion of initial plant tests (or pilot operation for a service venture)

Entrepreneurs should use pilot operations to challenge or change their assumptions and to produce information about the following:

Material suitability and costs

Processing costs and skills

Investment prerequisites

Training needs for production personnel, reject percentages and costs, and quality control requirements

Material uniformity from suppliers

Processing specifications, run time, and maintenance

Early data about these factors will improve performance and cost estimates during full-scale operations. In one case, entrepreneurs who were pilot testing a new process to be licensed for the manufacture of a frozen food product aimed at the traditional market for such products – the food service market – discovered that the product was physically more durable than anyone had thought it would be. By making a point of asking themselves what new opportunity this difference created, the founders identified the possibility of consumer marketing. Because the product was robust enough, they could automatically produce it in small packages and give it high product visibility – something that had never been achieved before in this product category. The planners had assumed that the new product, like the old, would be fragile and would require exorbitantly expensive manual packaging. Company executives revised the marketing plan to include consumer as well as food service marketing.

Fortunately, the executives had also decided not to enter any licensing agreements until they had learned all they could from the pilot studies. Now they could raise projected royalties without potential clients accusing them of reneging on prior agreements.

Milestone 5 – market testing

The first truly demanding challenges of the venture's basic market assumptions occur at this milestone. The questions managers ask themselves now are:

Have customers demonstrated that they'll buy the product? Why are they buying it? Why are they not buying it?

Is it really different from and superior to the competition?

Are the pricing assumptions still valid, considering emerging information about costs?

Does the product perform well in varying field applications? Where do the problems lie and why?

How should we modify estimates of achievable market share and size and target markets?

Are our servicing requirements assumptions accurate?

What impact does this information have on plans and timing?

A group of people who had developed a new electronic device for amateur band musicians decided they could build a worthwhile small business. The first step was to produce a few hundred units for market testing. The entrepreneurs decided to make no commitment to fixed costs until they had learned from market tests at what volumes the product would sell. So they subcontracted all tasks and proceeded to test market with virtually no overhead. Test market results showed the business potential to be marginal, and the inventors dropped the project with a negligible loss.

Milestone 6 – production start-up

The first successful production run tests the revised assumptions generated from pilot operations. The first runs are likely to reveal a host of problems that need solving. Most important, project planners will learn the true costs of producing a steady flow of the product and of meeting the quality requirements. Unfortunately, entrepreneurs consistently miscalculate the time this process takes and its impact on the timing for future events – especially plans for expanding the marketing effort and financing requirements.

Selling and making delivery commitments in anticipation of plant production can lead to extreme pressure to get the product out. Attempting

to squeeze product out of a plant that is running into start-up problems can result in compromises in product quality along with production at enormous rejection rates, both of which give rise to customer dissatisfaction and waste huge amounts of resources. This vicious circle can destroy a new venture.

In the start-up of a baked food business, a new plant scaled up from a pilot operation ran into quality problems from trying to produce too much too soon. Because the owners had already made significant delivery commitments to customers, many of whom had in turn employed sales forces to sell the product, the new business found itself operating at full scale with rejects at 20 times the planned level. The owners needed months to solve the problems and years to recover from the losses.

Planners can best manage production start-ups by making up a separate critical-path milestone plan for them and by providing for inventory accumulation before shipments begin.

Milestone 7 – bellwether sale

In the industrial market, this is the first substantial sale to an expected major account. In the consumer business, this is the first important sale to a significant distributor. Achieving this sale is likely to give the new business a big push forward; failure to achieve it can become a stumbling block to sales growth. Entrepreneurs learn the following from this milestone:

How their product compares with the competition in the real world rather than on a limited test basis.

Whether the product is functional.

Whether to continue or alter the initial selling method.

Information about service requirements on a continuing basis.

Additional data regarding quality controls and specifications.

Ideally, the bellwether sale will be to an important prospect who has been in contact with the owners during the entire development of the new business and whose needs the owners have considered along the way. New opportunities may present themselves as well.

Federal Express's experience with IBM as an early large customer illustrates the learning opportunities this milestone offers. Instead of congratulating itself on its good fortune, Federal Express investigated why IBM was so strong a customer and learned that the company was using its service to reduce inventories of very expensive parts that IBM service bureaus held to support customer service. Federal Express then modified its marketing effort and targeted a significant portion of its promotion on the particular needs of its industrial customers rather than only promoting package delivery service. The company thus rapidly identified and secured a much larger industrial business than it had expected.

Milestone 8 – first competitive action

It's obviously impossible for entrepreneurs to know in advance how competitors will respond to a new product or service. It is possible, however, to plan alternative responses to possible moves and study these moves to learn what rivals' true competitive position is.

Consider the case of an instrument company that in early 1984 developed a highly innovative microprocessor-based device. Its entire marketing campaign depended on how close a significant competitor was to coming out with an equivalent product. The top executives reasoned that if the competitor were close, the response to the new product would be to cut the prices of its existing products to reduce inventories. On the other hand, the competitor would likely first attempt to defend share by increasing its sales promotion, advertising, and other marketing efforts if it weren't ready with a similar new product. When the competition did not cut prices, the instrument company moved aggressively into the market and by late 1984 it still had the market to itself.

In another instance, a leading travel wholesaler introduced a series of tours to the Middle East but hoped to discourage its biggest competitor's standard follow-the-leader reaction. The wholesaler deliberately held off from its largest advertising and promotion activities until the competitor acted. The wholesaler figured that if the competitor entered the market in a tentative manner by offering only one or two tours, that would signify only half-hearted commitment. If it entered on a grander scale, it meant business. When the competitor offered only one tour, the wholesaler responded with a blockbuster marketing campaign, which appears to have scared the competition off permanently.

Milestone 9 – first redesign or redirection

Entrepreneurs may discover at any point on the milestone path a need to redesign the product or alter the target market. This redirection may recast prospects for the entire venture or, at the other extreme, create whole new areas of opportunity by defining follow-on product or market needs. At this point, entrepreneurs learn the differences between what they have offered and what the market needs.

The redesign or redirection decision is a time for reexamining all the basic assumptions concerning market size, segments, investment requirements, pricing, and financing (both needs and availability). A dramatic example is the design and marketing of Apple Computer's Lisa to combat the IBM PC with enhanced features and capability. Although greatly admired for its technical aspects, Lisa sales lagged, and Apple discontinued it. The company did notice, however, a potential market in the personal computer arena for many of Lisa's features. Apple incorporated several of them into its Macintosh at a much lower price and reached a mass market.

Another case involves Thermo-Fax, which failed when 3M introduced it for researchers in copying library documents. The company redesigned the product for the office market and it became highly profitable.

(8)

Milestone 10 – first significant price change

New venture planners must base all their pro forma activities on assumptions regarding prices, costs, and competition, but the true value of a product or service is difficult to know until the company launches it in a competitive environment. Changes in competition, technology, and costs may force a large price revision, which, because of its direct effect on the bottom line, can make this milestone the most important in determining whether to abandon a project or redirect it. Entrepreneurs need to ask themselves at this stage:

> Will the price change be permanent or temporary?
>
> Is the business viable if this change is permanent?
>
> If not, what can we do to restructure fixed and variable costs to make it viable?
>
> Can we isolate the price change to a particular market segment?

In one case, the managers of an electronics business wanted to supply digital switching gear to the telecommunications field, but they encountered strong price resistance from telecommunications companies when they offered the equipment for sale as a unit. The price assumptions had been wrong because an insufficient incentive existed for replacing the existing product. Management offered to install the equipment and charge on a per usage basis but still had no success. Their price assumptions were still wrong because the new charge would be too high for the companies' clients. Finally, management unbundled the services and offered standard switching at a low per usage cost for the direct customers and specialized switching options (such as automatic disaster or other emergency signals) for the customers' clients on a monthly rental basis. This approach succeeded.

Milestones, millstones, or tombstones?

Milestone reviews are pointless unless managers use them for making decisions. The decisions help planners determine what they can do to ensure success or reduce the cost of failure.

Each new venture has its own set of milestones. Descriptions of these important events should include a statement of the significant questions that managers need to ask to test their assumptions at each stage. Such a design forces planners to learn as well as to replan on the basis of what they have learned. The milestone approach satisfies the dual need for planning and flexibility and makes obvious the hazards of neglecting linkages between certain events.

Decision choices at each milestone are not limited to either pouring more money in to make the highly improbable occur or aborting the project altogether. Equally feasible possibilities include slowing down, speeding up, trying something to learn more, redirecting, changing scale, or postponing or resequencing certain actions. The point is that milestone planning takes entrepreneurs at the lowest possible cost to the next important stage, where they can make informed decisions rather than blunder along adhering to a fixed plan that out of ignorance they have based on faulty projections.

In summary, we recommend that new venture managers adopt the following procedure when developing a business plan:

1 Identify the most important events or actions that must occur to achieve your objectives.

2 Determine which events are prerequisites to others, that is, the necessary sequential links between events.

3 Develop a critical-path milestone chart that graphically displays the sequence.

4 Identify the significant assumptions on which the venture's success depends.

5 Ask if an event on the milestone chart will test each assumption. If not, design such a step and insert it. Specify what information will replace the assumption and how you will obtain it.

6 As each event occurs and replaces assumptions with information, review the planned future events. Where necessary, change their sequence and nature. Evaluate the business based on evolving and changing projections. Ask yourself along the way: Do the upside gain, downside risk, and feasibility assessment still justify moving ahead?

7 Establish a review schedule that relates to event completion as well as time factors. Evaluate performance based on what you have learned and what you can apply.

8 Rather than argue about whether results met projections, design financing rewards – and resource allocations and rewards – based on the results achieved.

Growing Concerns

22

WHARTON REPROGRAPHICS

The politics of new venture management

Ian C. MacMillan

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Growing Concerns

Topics of particular interest to owners and managers of smaller businesses

Edited by
David E. Gumpert

The politics of new venture management

Ian C. MacMillan

Entrepreneurs trying to transform a business idea into a new venture can get so enthusiastic that they forget how it looks to the rest of the world. Potential lenders, of course, are concerned whether loans will be repaid. Potential suppliers, too, worry about being paid for goods and services requested by the fledgling business. And prospective customers invariably wonder whether the new venture can really deliver on its promises. Customers may feel threatened if the new venture is offering products that make recently purchased inventories or equipment obsolete.

More often than not, none of these parties – so important to the entrepreneur – wants to be the first to commit itself to a new venture; each wants to see evidence of initial commitment from elsewhere. Entrepreneurs must learn to anticipate resistance or reluctance, and develop political skills to neutralize and overcome it. This article outlines an assortment of steps they can take to break down reluctance, including coalition building, bypassing resisting groups, developing networks, and enhancing rapport with opponents. Although it focuses on new enterprises, the results also have relevance for corporate managers concerned with starting new businesses within existing companies.

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In setting up new ventures, entrepreneurs tend to focus on the technical, marketing, and financial feasibility of their endeavors. While all these aspects are necessary for a venture's success, they are not sufficient in themselves.

Entrepreneurs cannot neglect a separate and rarely considered component of success – management of the politics of the new venture. The entrepreneur must be able to mobilize all parties with a stake in the venture to commit themselves firmly to it. These parties are outsiders – bankers, investors, suppliers, and customers – as distinct from insiders, who would include partners and employees. Without the necessary political skills to overcome initial resistance, the greatest entrepreneurial ideas remain but dreams.

Political skills are especially necessary for ventures using low technology, of modest scale, or with limited protection from competitive imitation. These don't have the glamorous traits of high-technology ventures, including easy patent protection, spectacular growth potential, and large potential returns on investment, which many venture capital firms find so attractive.

Where resistance lies

To identify the key political challenges that face entrepreneurs, I investigated eight new ventures from the stages of initial idea to final launch:

☐ The first entrepreneur encountered several major political obstacles while attempting to launch a quality magazine. She found material and equipment suppliers reluctant to extend credit, distributors reluctant to pay in advance for copies of the magazine, banks unwilling to provide unsecured funds, and advertisers hesitant to make commitments until the magazine had built sufficient circulation. When these parties finally did develop some interest in the venture, each one insisted that someone else make the first commitment.

☐ The second entrepreneur wanted to act as an agent for inventors seeking to sell their inventions to

established companies. He encountered tremendous resistance from R&D departments, which viewed his service as a threat to their competence. Because one of the inventions he was attempting to broker threatened to render obsolete a large research project in a target client company, its R&D department fiercely resisted his services. He also found that many potential clients shrank from retaining him as an agent before he had a track record in delivering satisfactory inventions. Finally, because inventors were afraid their ideas might be stolen, they were reluctant to show the entrepreneur and his clients their inventions.

☐ The third entrepreneur sought to start a consulting business to bring together clients wishing to transfer technology between the United States and foreign countries. He intended to handle the acquisition, purchase, licensing, or joint venture arrangements to enable U.S. technology to be marketed abroad, or foreign technology to be marketed in the United States.

This entrepreneur encountered problems similar to those of the invention broker. Several R&D and engineering departments of target companies regarded his activities as a threat to their interests. One manufacturing division strongly resisted the technology he suggested; he later discovered it had recently installed equipment that could be made obsolete by a new technology that he was offering. He found potential clients reluctant to provide him with up-front funds to do the marketing research necessary to find suitable prospects for transactions. They also expressed concern about the risk of revealing their technologies to him and interested, but uncommitted, third parties.

☐ The fourth entrepreneur wanted to start a haute cuisine catering service for private parties and business functions. This person found that potential clients were unwilling to risk their personal or professional reputations on an unknown catering service. It became increasingly obvious that he was in a Catch-22 situation: a prestigious client was necessary to attract other clients but no prestigious clients would sign up until he had already landed a prestigious name. Moreover, a key partner hesitated to join the venture unless it appeared to have a strong chance of survival. Finally, the unwillingness of suppliers to extend credit until the venture proved viable threatened an enormous cash-flow strain on the business.

☐ The fifth entrepreneur identified an application for synthetic filter cloth in an industrial market relying on cotton. For approximately twice the price, the synthetic filter had three to four times the lifespan of cotton filters and yielded better results. The entrepreneur wanted to purchase fiber in bulk, have it processed by an outside contractor, and then distribute the product to manufacturers.

He encountered resistance from a supplier whose marketing group thought it should have come up with the idea. Ignoring the fact that he was offering a new, different range of synthetics, manufacturing managers in target companies also resisted. They claimed that synthetics "had been tried before and had not worked." In addition, they claimed it wasn't worth keeping stocks of various synthetics for differing applications when all they needed was one type of cotton product. Finally, purchasing agents would not commit themselves until the feasibility of the fiber had been proved, and this could take up to nine months. He was short of funds but could not get banks to supply the financing or suppliers to provide the credit, which he needed to wait out the test period.

☐ The sixth entrepreneur wanted to launch a wholesale travel business. His plan was to buy block bookings on an aircraft or ship, design a tour and arrange accommodations, and retail the package to, say, a company that would use the tour as an incentive for sales performance or as a conference location. His idea was to pick destinations and tailor tours to suit companies' particular needs. He encountered resistance in client companies from people responsible for creating incentive programs, who felt threatened by his plans. Carriers and potential clients alike hesitated to trust an unproved tour packager.

☐ The seventh entrepreneur sought to build an advertising copy service based on her ability to create catchy and intriguing ads for mundane products and services (owners of such products and services frequently encounter little enthusiasm from established advertising agencies). She intended to specialize in brochures, pamphlets, product-line catalogs, and usage instructions, which, imaginatively done, can be a useful, inexpensive way of differentiating a company's products from those of competitors. To her surprise, she met intense resistance from people inside target organizations who claimed that her suggestions, if implemented, would disrupt packaging inventories and distribution procedures in return for very little in the way of perceived benefits. Some insisted that it would be necessary, and costly, to scrap master plates or lithos for existing copy.

☐ The eighth entrepreneur wanted to make a high-quality souvenir for the tourist business. However, distributors, fearing she would be unable to produce the souvenir with the required quality and to deliver it on time, declined to take orders until they had seen a prototype. Potential lenders refused to supply development funds until orders had been placed, and designers insisted on substantial progress payments to work on the prototype. Meanwhile, she greatly feared that an existing company, which had started to investigate the potential market, would decide to produce the souvenir first.

In all these cases, despite the clear presence of markets for technically feasible products or services, these people encountered major political obstacles arising from doubts about their ability to deliver on their promises.

These experiences help identify several important political issues that an entrepreneur must resolve.

Unexpected enemies

Five of the eight entrepreneurs encountered groups or individuals other than competitors who had a vested interest in the failure of the new venture. Clearly, the invention broker, the technology transfer consultant, the travel tour agent, and the copywriter threatened groups or individuals within potential client companies. It was a sobering experience for these entrepreneurs to discover that the most significant problems lay with

(6)

active resistance from suppliers and customers. Entrepreneurs launching a business should anticipate such resistance, which saps vast amounts of valuable time and effort.

Before launching a venture, then, the entrepreneur is well advised to consider which groups or individuals in the chain of suppliers, distributors, and clients are likely to be somehow threatened by the new venture. If their resulting resistance could be effective, the entrepreneur must develop a coping strategy or risk the venture's failure.

Entrepreneurs can take three steps to overcome vested interest in failure:

1 **Co-opt the obstructing group.** The technology consultant and the invention broker eventually won support from resisting R&D groups by making sure to acknowledge these groups' contributions, particularly to senior management.

The filter distributor achieved great success by arranging for a recalcitrant production manager of a target industrial manufacturer to be *associated* with the venture's success and *dissociated* from the venture's failure, thus making his commitment risk free. He emphasized this arrangement by saying to the company president, in the manager's presence, that "with the kind of good advice Joe's given me and with all Joe's past experience, it certainly won't be Joe's fault if the filters don't work like dynamite." Thus publicly absolved of all risk, Joe became a staunch supporter of synthetic fiber products and a useful reference in securing other sales in the industry.

2 **Build a coalition.** Three entrepreneurs forged alliances of sorts with groups or individuals in customer and supplier organizations. These served to counter attacks by those organization members who had an interest in the ventures' failure. The strategy helped get the ventures going, but it also created polarized groups within the target organizations. The resisters seized every possible reason to justify their contrary position, and every entrepreneur underestimated the time and effort needed to cope with the resulting strife.

The invention broker formed an alliance with the client organization's marketing department. This coalition supported his position that a key person in the R&D department was being obstructive and secured the removal of the obstructionist, thus resolving the problem. He subsequently preferred the strategy of co-opting his opponents, however, and only occasionally resorted to coalition building.

3 **Bypass resistance.** This strategy focuses on an organizational level higher than the source of resistance. Four entrepreneurs tried at one time or another to persuade senior managers in customer and supplier organizations to force reluctant subordinates to accept their ventures.

Bypassing generally met with better success than coalition building. The entrepreneurs overcame the source of resistance without the resistant parties loosing face. Sometimes, however, this "reluctant compliance" led to time consuming implementation problems.

The risk factor

In the absence of active resistance, reluctant stakeholders can prove to be a serious, if not fatal, stumbling block. Why should a supplier, banker, financier, or customer run the personal or professional risk of giving support to an embryonic venture when the status quo appears to be working well? Most new ventures are quite chancy; often the safest option for a potential stakeholder is to refuse support. All eight entrepreneurs that I studied seriously underestimated the time required to sell their ideas to reluctant stakeholders.

Simply recognizing this problem is important: several entrepreneurs encountered serious difficulties because they would not recognize the validity of stakeholders' concerns. Until they came to see the situation through the eyes of potential backers, they were either inclined to dismiss these reluctant stakeholders as stupid, fainthearted, or obstructive, or they tried to use irrelevant arguments and facts. It was only when the entrepreneurs realized that potential supporters were taking a real risk with their support that they focused on strategies to deal with this problem:

Reduce stakeholders' risks. One way to overcome initial reluctance in stakeholders is to devote attention to reducing their risk.

For instance, the filter cloth manufacturer realized that potential customers were reluctant to pay double the usual amount – up front, in cash – for an untried product and then wait several months to see if their faith was justified. He decided that the only way to get the business started was to suggest to a large and prestigious client that payment could be made after a satisfactory trial period. Although the potential user was still reluctant because the synthetic filter might create production problems, the barrier of high initial purchase cost had disappeared.

In a similar vein, both the invention broker and the technology transfer consultant made nondisclosure agreements with inventors and researchers as assurance that their ideas would not be stolen.

Develop an influence network. If an effective way of reducing the risk cannot be identified for the stakeholder, the entrepreneur is obliged to at least demonstrate credibility. One way of developing credibility is via a network of influential contacts.

In fact, in every case I studied, the entrepreneurs eventually developed groups of influential contacts. Two, with previous new venture experience – the quality magazine publisher and the invention broker – spent time developing networks long before attempting to launch their ventures. The other six evolved contact networks as their businesses developed.

As all these businesses evolved, it became apparent that the old aphorism is correct: "whom you know" is as important as "what you know." Strengthening commitment at each round, entrepreneurs shuttled among various stakeholders until finally the ventures started to come together.

Establish credibility. An entrepreneur's credibility as a business person is particularly important in building a network. All entrepreneurs found it especially helpful to develop a business plan that they could present

to stakeholders. They also found it important to demonstrate a successful track record.

The three entrepreneurs who had the fewest difficulties getting started already had experience in the industries of their new ventures. Two others had expertise with their product and service but no business background. Three, with neither experience nor expertise, eventually convinced stakeholders of their credibility by using credible contacts as references. Apparently stakeholders interpreted the entrepreneurs' abilities to generate moral (if not material) support from influential references as proof that they had the necessary skills to pull the projects together.

Entrepreneurs seeking quick development of an effective network could benefit from some careful planning. My observations of network building indicate that the following procedures speed up the process:

1 Identifying people and organizations among existing connections who are close to potential stakeholders.

2 Seeking criticism, advice, and suggestions on the new venture from these people.

3 Asking them for advice about contacts (at least two) to approach in target organizations and getting permission to use their names when doing so.

4 Asking them what preparation is necessary before speaking with the target contacts and doing the necessary preparation.

5 Telling existing connections later how they have been particularly helpful, thus cementing useful relationships.

6 Repeating these steps for the new sets of contacts.

Importance of rapport

Once new venture owners develop a network, they need to nurture it to obtain maximum benefits. This can be done initially by:

Stressing commonality. All eight of the people I studied discovered they had interests in common with their contacts arising from such things as similar backgrounds, experiences, schooling, training, ethnic origins, families, religions, and friends. They devoted time to reinforcing these commonalities.

Seeking advice. To develop rapport, four entrepreneurs often sought advice from their contacts. The contacts seemed to feel more favorably disposed toward owners who asked for their opinions. Individuals who followed up by letting the contacts know how their advice had been helpful solidified their relationships even further.

Providing help. Some entrepreneurs took a reverse approach; they made a point of learning about each contact's difficulties or irritations. They then followed up with suggestions to solve these problems, either directly or by referring them to others who might provide solutions; this approach enabled the individuals I studied to demonstrate either their own expertise or their ability to draw on their own networks. Once again, the result was increased respect and improved rapport with the contact they were building.

The process of network building was very time consuming, often taking weeks of patient and determined effort. It eventually paid off for four of the ventures analyzed. The other entrepreneurs, however, found that even this effort resulted in insufficient support. An additional political skill was required to turn their ventures into reality.

Forging keystone alliances

When all else fails, entrepreneurs may have to launch their ventures by securing the support of an outside party—a keystone ally—who develops a vested interest in the venture's success. In four of the cases I studied, the ventures came together only after the entrepreneurs had developed a strategy to secure support from such keystone allies.

The quality magazine publisher finally succeeded in starting up by persuading an equipment manufacturer to supply expensive, sorely needed equipment on a trial basis. She enlisted the help of this keystone ally by convincing him that her venture could demonstrate the equipment's capability in a new market. The consequent favorable impact of this loan of the equipment on cash-flow requirements induced reluctant financial backers and her other suppliers to finally commit themselves to the venture.

The synthetic fiber distributor persuaded a raw material supplier to provide a limited amount of stock on 270-day credit by arguing that he had a prestigious customer who would take the product on a nine-month trial but that the customer would guarantee payment only if the product performed to expectations. He used this stock to convince the customer to place an order. With this order in hand, the entrepreneur secured orders from other customers, but on 90-day credit, and was thus able to launch the entire venture.

The souvenir manufacturer could get no support for her venture until she could present a fully developed prototype that required expensive design work. She found a foreign designer looking for a chance to demonstrate his skills in the United States who was prepared to postpone payment for his services. Thus, the prototype was developed at little up-front cost. Other stakeholders, particularly distributors, then started to provide support, and the venture was finally launched.

Finally, the caterer persuaded the university that he had attended to enter into a contract for his services, appealing to the institution as his alma mater. This agreement guaranteed enough support to meet the initial fixed costs of the venture. More important, he then parlayed the account's prestige into several other influential accounts. These commitments convinced a key partner to join the operation.

In each of these latter cases, the owner was able to break an impasse by focusing on an important area where vested interests coincided and a keystone alliance could be forged. This provided the impetus needed to initiate the venture. The facility to pinpoint

vested interests and to forge such a keystone alliance is an important component of an entrepreneur's repertoire of skills.

Anticipating the difficulties

In summary, several lessons seem clear. First, to avoid delay and frustration in getting the venture off the ground, the entrepreneur must anticipate resistance from groups or individuals in the stakeholders' organizations.

Next, unless a clear and compelling benefit exists for all stakeholders, entrepreneurs are wise to anticipate reluctance from some stakeholders to risking their resources or reputations, and they should develop strategies to reduce this reluctance.

Finally, despite stakeholders' expressed interest in a venture, entrepreneurs may find themselves in a Catch-22 situation whereby stakeholders will not join in until commitments from other stakeholders are forthcoming. Here the challenge is to put together a keystone alliance with the key subset of stakeholders.

For those ventures that lack the allure of high-technology products, market and technical feasibility are necessary but not sufficient conditions for the launch and subsequent success of a new enterprise. A vital ingredient is political skill in managing new ventures.

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23

WHARTON REPROGRAPHICS

Styl France

Master craftsman Czeslaw Bereza retired to his small smoke-filled office as workers finishing the early shift on a summer day in 1992 filed out the door of Styl France's manufacturing plant in northern Poland. Under Czeslaw's direction, Styl France had been producing high-quality, antique-style furniture at its Polish factory for over two years. In Poland, where competition was negligible and labor was inexpensive, the business had become phenomenally successful.

A native Pole, Czeslaw had spent most of his life in France. There, he had manufactured furniture on a limited scale but was constantly harried by financial difficulties and stiff French competition. When promising free-market reforms were unleashed in Eastern Europe, Czeslaw eagerly returned to Poland. Within a short time, he established Styl France, trained a small work force, and began to manufacture antique replicas. All of the factory's output was shipped to Czeslaw's two partners in southern France, who in turn sold it to antique dealers and wealthy French homeowners. Despite two eight-hour shifts, the plant could not produce furniture fast enough to fill the enormous demand in Lyons.

With orders piling up at the factory and the number of export shipments to Lyons increasing every month as workers became more productive, Czeslaw should have been ecstatic. Instead, he was considering resigning his position as director of Styl France's manufacturing operation and giving up his ownership stake in the venture. He was unhappy with the company's organizational structure, and his business relationships with his partners had begun to sour. Because Styl France was set up so that all of its furniture would be exported to a single distributor in Lyons, Czeslaw was unable to take advantage of promising opportunities in other European markets. Furthermore, Czeslaw's French partners had been negligent in supplying the Polish factory with raw materials, and, by selling company-produced furniture through their own retail shops, they had been skimming profits from Styl France's coffers. Now, ironically, just as business was booming at the factory he had established, Styl France's master craftsman was considering abandoning the operation and striking out on his own.

This case was prepared by Research Associate David T. Kotchen under the supervision of Professor Gary W. Loveman as part of a research project with Professor Simon Johnson of Duke University. It is intended to be the basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation.

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Czeslaw Bereza

In 1960, Czeslaw Bereza's father, a carpenter by trade, decided to flee Poland in search of a better life abroad. He loaded his family and meager belongings into a car he had borrowed from a friend and set out on a midnight journey for France. After a safe trip, the family eventually settled in Lyons, where, under his father's influence, the twelve-year old Czeslaw began to learn the carpentry trade. Czeslaw proved to be exceptionally talented, and by the time he was 15 years old, he was already working full time turning table legs and other specialty furniture pieces, producing them on sophisticated carpentry machines.

Czeslaw continued to develop his woodworking talents, and over time he developed a local reputation as a master craftsman. In 1982, he managed to acquire some used machinery and opened his own antique repair shop in Lyons. Although his work was of high quality, the operation was too small to produce suitable profits, and by 1985, financial problems forced him to find other work. He began moonlighting as a wood-shop instructor at a private school for delinquent youths, an experience that was to serve him well once he opened a furniture factory in Poland. In 1989, after Poland's Communist government suffered a humiliating electoral defeat at the hands of reform-minded Solidarity, the opportunistic Czeslaw was captivated by radical changes in his country.

Poland's new government implemented free-market economic reforms at breakneck speed. By early 1990, private enterprises were no longer restricted in size or scope of activity. Unnecessary ministerial authorizations were abolished. The Polish zloty became convertible on domestic exchange markets. With few restrictions, foreign companies were permitted to do business in the country and to operate foreign exchange accounts. Suddenly, opportunities seemed to be unlimited for the entrepreneurially minded in Poland.

In a land of economic reform and inexpensive labor, Czeslaw felt that he could leverage his carpentry talents into a powerful business venture. With little incentive to remain in France, and with his Polish roots and the newly liberalized economy drawing him to Poland, Czeslaw decided that he would return to his native country to establish a furniture manufacturing business.

Setting Up Shop in Poland

Although Czeslaw had bold ideas, he lacked funding, and Polish law required that a foreign-operated company be established with a minimum of $50,000 in start-up capital. Thus, because he was unqualified for bank loans, Czeslaw was forced to search for a partner who could provide financial backing. "The French are very conservative," he complained. "It was difficult to find a partner who was willing to do business in Poland." Just as his search was beginning to appear hopeless, Czeslaw managed to contact one of his former furniture customers, August Royet. Royet had emigrated to France from Italy 20 years earlier and had been operating an antique furniture dealership outside Lyons ever since. Intrigued by the idea of low-cost furniture production in Poland and confident in Czeslaw's carpentry talents, Royet agreed to provide financing for a Polish manufacturing plant.

Each partner agreed to contribute the equivalent of $25,000 to the venture. Czeslaw would provide his share in the form of machinery from his antique repair shop in Lyons, while Royet's $25,000 contribution would be a mix of used machinery and operating capital. The new company,

which would specialize in the production of imitation antique furniture for export to Lyons, was to be called Styl France. At this early stage, it was difficult for Czeslaw and Royet to make detailed operating plans for the company without first surveying the business environment in Poland. Thus, in April 1990, Czeslaw set out on a northeastern journey to make arrangements for Styl France's Polish manufacturing facility.

Fortunately, Czeslaw already had a useful contact in Poland. For almost a decade, he had been making a yearly trip to Sopot, a small town on Poland's Baltic coast, to spend his vacations with Andrzej Magielka, a Pole whom he had met in France in the 1970s. Once he and Royet had agreed to create the company in Poland, Czeslaw turned to Andrzej for assistance. Andrzej, who ran a small firm that traded in wood products, knew the terrain of northern Poland and had remained abreast of the country's rapidly changing regulations for private business. Wishing to capitalize on Andrzej's expertise, Czeslaw hired him as a consultant for Styl France.

Andrzej's first assignment was to locate a production facility for the new company. He traveled to Kashubia, a rural region in northwestern Poland that was far removed from fast-rising, free market rents in Sopot and Gdansk. There, in a town called Kartuzy, Andrzej happened upon a privately owned chicken farm that had been forced to shut down its operations when Poland's new free market prices had driven customers away from the poultry market. With several renovations, the farm's breeding facility—a large, open barn that was well ventilated—would be an ideal location for Styl France to begin producing its furniture. Andrzej introduced himself to the owner, who, after an afternoon of discussion over vodka and kielbasa, agreed to rent Styl France the 850-square meter barn for the equivalent of $200 per month. That evening, having secured the manufacturing facility, Andrzej boarded a train for Warsaw, where he would register the new company with the appropriate government offices.

With Andrzej handling administrative details in Warsaw, Czeslaw set about renovating the poultry facility in Kartuzy. He gutted the building's interior, which was still outfitted with breeding hutches, and quickly installed the electric saws, sanders, and other pieces of carpentry equipment—a total of eight machines—that he and Royet had transported from France. As soon as the machinery was installed, he placed an employment announcement in the local newspaper, and, from amongst the throng of local farmers that responded—all of whom wished to abandon a difficult agricultural life for work at a "French" company—Czeslaw hired five workers, none of whom had experience in furniture manufacturing. In May 1990, equipped with a production facility, imported machinery, and a newly hired workforce, Styl France was ready to begin its manufacturing operations.

Initially, Czeslaw devoted almost all of his time to training his inexperienced workers. "When I worked as an instructor in France," he said, "I had to start from nothing and create professional-level carpenters in 500 hours. This turned out to be ideal preparation for what I was to face in Poland." For almost two months, Styl France operated with virtually no output as Czeslaw schooled his Kashubian farmers in the art of furniture manufacturing. With no product on the market, however, Styl France was unable to generate turnover to cover operating expenses—which included salaries, factory overhead, and wood imports from France—and Royet was forced to borrow 180,000 francs from a French bank to keep the company afloat. Yet, Czeslaw was an expert trainer, and by August, Styl France had managed to produce its first 80 pieces of furniture, all of which were exported to Royet in Lyons.

Czeslaw and Royet had decided to focus their sales efforts on the French market for two reasons. First, both partners were well-connected in the antique furniture business in southern France,

and they felt that demand from this market alone would be sufficient to keep Styl France producing at capacity. Second, the company gained a substantial tax advantage by selling its products in France rather than Poland. To protect domestic wood-based industries, the Polish government levied a 30% duty on imported lumber and a 20% duty on imports of finished wood products. However, these taxes were not binding if the wood was imported, the product was manufactured in Poland, and then exported to a foreign market.[1]

At the same time that Czeslaw established Styl France in Poland, Royet created a "sister" company in Lyons called Styl France Diffusion (Diffusion). Czeslaw would produce furniture in Kartuzy, ship it to Diffusion at cost, and Royet would then sell it on the French antique market. From its profits, Diffusion would cover all of Styl France's operating costs. Furthermore, Diffusion would supply the Polish manufacturing facility with high-quality walnut and cherry wood from France.

Styl France's Operations

In Kartuzy, Styl France produced high-quality, imitation antique furniture in a style called Louis Philippe. The company's products included desks, wardrobes, tables, chairs, and cabinets. Styl France's most popular piece was a walnut jamcase; by 1992, the company was producing between 400 and 500 of these small chests per year. (For a depiction of some of the company's products, see **Exhibit 1**.) All products were made entirely of wood, and, because labor was inexpensive in Poland, much of the production work was performed by hand.

Czeslaw was a self-trained master carpenter, and his manufacturing methods were based largely on intuition and experience. Under his guidance, the factory assumed a workshop-like character. Furniture was produced in small batches—often only 10 or 20 pieces of a single type were produced at once—and workers were expected to do whatever was necessary to complete each piece. "There was no specialization in the factory," said Czeslaw. "Often a small group of two or three workers would manufacture a batch of furniture from start to finish." In Poland, where Styl France paid workers 11,000 zlotys per hour,[2] labor was inexpensive. According to Czeslaw, the total hourly operating cost per worker at Styl France's factory was 30 francs; in France, the same hourly measure was approximately 150 francs.

The high labor content of Styl France's production process gave the company's furniture a significant advantage on the French market, where handcrafted furniture was highly valued. Although there were several companies in France producing similar furniture, their manufacturing processes were entirely machine-based. French labor was too expensive to allow for handwork. As a result, the French furniture did not have the curves or the natural appearance of Styl France's products.

Styl France imported high quality walnut and cherry wood from France, while lower quality alder wood was supplied by a local Polish company. Whereas the walnut and cherry wood was used for all visible surfaces, the alder wood was used for backing, drawer interiors, shelves and other furniture components that were not immediately visible. Sixty percent of the wood content of Styl France's furniture was alder, and the remaining 40% was walnut and cherry. Initially, the company

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1. Styl France imported a substantial portion of its wood supplies from France.

2. Apprentices were also cost effective for Styl France: the company was reimbursed by a government agency for all wages paid to apprentices.

cut and dried its alder wood in-house, but this proved to be a difficult and time-consuming process. Wishing to concentrate on furniture production, Styl France soon found a small local company that agreed to supply the factory with processed alder wood for the zloty equivalent of 1,300 French francs per cubic meter. In contrast, a cubic meter of walnut wood imported from France cost between 5,000 and 6,000 francs.

For furniture deliveries to its sister company in Lyons, Styl France hired a private Polish transportation firm. Each time a delivery truck was sent to Lyons with a shipment of furniture, it returned to Styl France's production facility in Kartuzy with a load of French walnut and cherry wood supplied by Diffusion. A single truck could transport approximately 170 pieces of furniture to Lyons, and between 20 and 25 cubic meters of wood on the return trip to Kartuzy. The cost to Diffusion for one round-trip delivery was 20,000 francs.

From Diffusion's warehouse in Lyons, Royet sold Styl France's furniture to antique dealers in 10 of France's southern provinces. The company did no marketing or advertising—the antique dealers' market was entirely connection-based. When Styl France produced its first batch of furniture, Royet informed his network of connections. When the furniture was shipped, French antique dealers already had trucks at the border waiting to take delivery. "The antique dealers know this type of furniture," said Czeslaw. "They knew what to expect. And Polish prices were very attractive."

A Typical Piece of Furniture

A characteristic product for Styl France was a three-drawer, three-cabinet buffet that the company called the Duc Saint Julien. Typically, three workers could produce five Duc Saint Julien pieces per day. The production process started in a small room in the front of Styl France's manufacturing facility, where the company stocked all of the wood that it received from its French and Polish suppliers. There, workers traced the shapes of the 40 pieces to be used in the buffet onto long slabs of rough lumber. These pieces were cut from the lumber by electric saw and then sanded until all sides were smooth. Freshly sanded, the pieces were brought into the main room of the production facility, which contained all of Styl France's large machinery. Here, workers moved briskly from one machine to the next, boring into the buffet's components grooves and slats that would enable the pieces to be joined once the Duc Saint Julien was moved into the next stage of production, assembly. In the assembly—or "montage"—phase, workers transferred the buffet's intermediary components to a large cement floor space that had been cleared of all machinery, wood scraps, and sawdust. Here, the main body of the buffet, as well as drawers, doors, and shelves were assembled by hand from the individual wood pieces, glued, and left to dry for several hours on hydraulic presses that lined a nearby wall. Once the glue had dried and workers were confident that the drawers, shelves, and doors were firmly assembled, these larger pieces were fitted onto the Duc Saint Julien's main body. At this stage, workers sanded all decorative curves into the buffet's exterior. Hand-sanded, rounded corners were valued by customers much more highly than machine-cut, straight sides, and Styl France's furniture was recognized for its distinctive curves. Once the buffet's corners had been rounded and all doors and drawers were flush with the buffet's exterior, workers transported the Duc Saint Julien to a small finishing room, where it was painted with several coats of varnish and, finally, outfitted with all drawer handles and door locks. Once the varnish had dried, the completed buffet was packed in plastic wrap and stored in a small warehouse that was connected to the production hall, where it remained until Styl France exported its next shipment of furniture to Lyons.

The total cost of producing and exporting a single Duc Saint Julien buffet was 1,950 French francs, with individual inputs contributing the following amounts:

Labor and factory overhead[3]	650 francs
Polish alder	100
French walnut	700
Varnish and glue	250
Fittings (handles, locks, etc.)	150
Transport	200

Total	2,050 francs

Of the total cost, Styl France paid 750 francs for labor, factory overhead, and the Polish alder wood purchased from a local supplier. The remaining 1,300 francs for materials and transport were provided by Diffusion, which shipped French walnut wood, varnish, glue, and all furniture fittings to Styl France from Lyons. Styl France sold the Duc Saint Julien to Diffusion for 750 francs, which was just enough to cover its costs. In France, Diffusion sold the Duc Saint Julien for 5,500 francs.

Expansion

Styl France's furniture production operation grew rapidly. In the fall of 1990, Czeslaw and Royet decided to take on a third partner so that they could buy more machinery and expand the company's production capabilities. The new partner, Edouard Balestra, owned a furniture dealership in southern France and had been one of Styl France's main customers during the company's first few months of operation. Balestra contributed 50,000 francs and acquired a 33.3% ownership stake in the combined operations of Styl France and Styl France Diffusion.

By early 1992, the chicken breeding facility could no longer accommodate Styl France's production requirements. There was very little storage space, and working conditions became cramped as lumber piles, scrap wood, and completed pieces of furniture blocked the flow of work in process. When a nearby state-run woodworking cooperative went bankrupt in February, Andrzej negotiated an agreement that enabled Styl France to rent the cooperative's 1,500-square meter manufacturing facility, which included a storage warehouse and truck loading dock, for 30 million zlotys per month. Styl France employees immediately outfitted the factory with all of the company's old equipment, as well as new stationary saws, sanding machines, a lathe, and other high-quality woodworking machinery that had been purchased in France. The factory's workforce, which now included 22 carpenters and 18 apprentices and was organized into two 8-hour shifts, was soon producing 300 pieces of furniture per month.

By mid-1992, Diffusion's monthly turnover in Lyons had reached 600,000 francs. After assuming responsibility for Styl France's monthly operating costs of 120,000, Diffusion reinvested all remaining profits in the development of both companies.[4] By September 1992, Styl France was

3. Labor and factory overhead includes wages, a 20% wage tax, social security, building rental fees, and all factory operating costs.

4. The three owners each drew a monthly salary of 12,000 francs. Furthermore, Czeslaw earned an additional 9 million zlotys per month in his role as supervisor of the production facility in Poland.

exporting two truckloads of furniture to Diffusion every month and had a two-month backlog of orders. By all outward appearances, the Styl France—Styl France Diffusion partnership was enormously successful.

Second Thoughts

However, Czeslaw had grown dissatisfied with his partners. "They were responsible for providing me with raw materials," he said, " but they were not at all interested in production problems—only in prices and the trade side of the business." As a result, on several occasions in mid-1991, Royet and Balestra sent Czeslaw shipments of inexpensive walnut wood that proved almost impossible to work with. Freshly cut walnut wood could not be used effectively in furniture production. First, the wood had to be dried in specially designed heating facilities for approximately four months and then aged in storage warehouses for an additional two months.[5] In an effort to cut costs and lacking an understanding of the importance of the wood-drying process, Royet and Balestra began sending Styl France shipments of walnut wood that had not been dried or aged. Czeslaw was forced to find a Polish company that could dry the wood, which tied up a large portion of Styl France's lumber supply for four months. By the time the wood was finally dried, Czeslaw's French partners had depleted their furniture inventory. Unwilling to wait out the aging process, they demanded that the wood be used immediately in order to increase production volume at the plant. As a result, much of the wood became warped during manufacturing, and, where possible, production workers spent a great deal of time correcting imperfections. As productivity at the factory fell, Czeslaw's partners continued to demand greater quantities of furniture. Czeslaw, however, was unwilling to sacrifice quality, and for the last two months of 1991, the factory operated at low output levels as workers meticulously salvaged workable pieces of wood.

In addition to neglecting manufacturing problems, Royet and Balestra had not been entirely cooperative on the trade side of the business. From the start, the partners had agreed that Diffusion would assume responsibility for all marketing and sales of Styl France's furniture, largely based on their connections in southern France. However, in the summer of 1992, sales in southern France had stalled. "In France, during the summer, people are more interested in spending their money on vacations than on furnishing their homes," explained Czeslaw. Inventories began to accumulate in Styl France's warehouse as Diffusion developed difficulties attracting customers. Losing confidence in his partners, Czeslaw decided to send Andrzej on marketing expeditions to furniture fairs in Warsaw, Holland, and Belgium. At the fairs, Andrzej displayed several pieces of Styl France's Louis Philippe furniture, and in each country, he was able to attract a furniture retailer who ordered a complete set of Styl France's Louis Philippe line. As a result, Styl France's inventories disappeared by August and the company began to develop a backlog of orders. Although Styl France had handled all aspects of this highly successful international marketing effort, all orders, and hence all profits, were invoiced through Diffusion. The experience, however, had opened Czeslaw's eyes to the widespread marketing appeal of Styl France's furniture.

Finally, both Royet and Balestra owned private furniture retail shops in southern France, and they took advantage of their ownership stakes in Diffusion by buying from the company at cost.

5. Aging allowed the wood's fibers to relax and prevented the wood from warping during the furniture manufacturing process.

Since Diffusion made no profit on these sales, no benefits accrued to Styl France. In effect, Czeslaw was producing "free" furniture for his partners.

Czeslaw realized that the real competitive advantage of the company lay in the Kartuzy manufacturing operation and not in the distribution operation in France. Dissatisfied with his partners and aware that his furniture could be sold successfully in markets other than Lyons, he began to entertain thoughts of running a furniture production company on his own. However, he lacked capital. Virtually all of the machinery in Styl France's plant was owned by his French partners. In September 1992, Czeslaw pondered his situation:

> I would prefer to run this business alone. If I did not have my French partners, I could make profits of 100% to 200%! Unfortunately, I don't have the capital. It is possible to find a partner with capital, but difficult to find a partner who is responsible. And Polish bank credits are far too expensive to even be considered.[6]

Furthermore, Czeslaw had signed a non-competition agreement with Royet and Balestra, which stipulated that if he were to begin producing furniture for any other commercial interest, he would forfeit his ownership stake in Styl France.

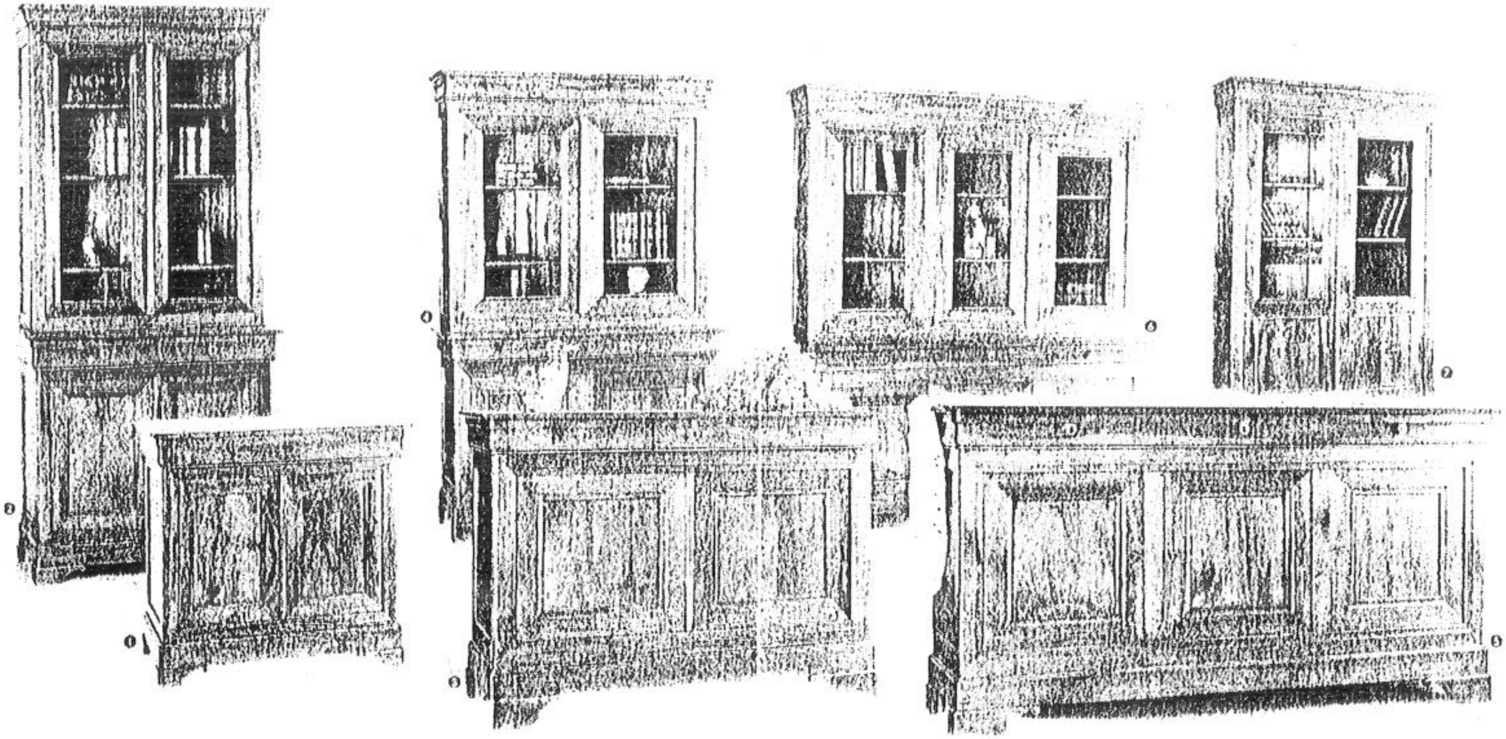
Lacking the resources to strike out on his own, Czeslaw insisted that changes be made in the company. In September, he demanded that Diffusion's operations be moved into a much larger building in Lyons, half of which would be converted into a retail shop that would provide substantially higher profit margins than Diffusion's traditional wholesale business. In fact, the only reason that Diffusion had not opened a retail operation in the past was that Royet and Balestra feared that this would draw business away from their own local shops. Reluctantly, Royet and Balestra acquiesced to Czeslaw's demands. Furthermore, hoping to eliminate the incompetence that his partners had demonstrated in supplying his plant with raw materials, Czeslaw insisted that a master carpenter be hired to oversee Diffusion's daily operations and to take charge of all wood shipments to Styl France. The company hired a close friend of Czeslaw's who had been repairing and selling antique furniture for 20 years.

Although it seemed that these changes would benefit Styl France's production operation, Czeslaw wondered whether he would ever be satisfied with the company's complex, cross-border partnership. He was locked into a relationship with partners he no longer trusted, his output was restricted to a single distant market, and he felt that he would be able to run a much more effective and profitable company on his own.

These thoughts ran through Czeslaw's mind as he took a final draw on his afternoon cigarette in the cramped office at Styl France's Kartuzy factory. Rising to greet the workers who were arriving for the second shift, Czeslaw decided that he would observe the operating results of the restructured Diffusion for several months, and then he would reconsider the possibility of establishing his own furniture production company in Poland.

6. In mid-1992, annual interest rates on loans from Polish banks were approximately 70%.

Exhibit 1 Center Exhibit of Styl France Brochure



1 **Duc de Saint-Julien:** Small low chest, Louis Philippe style, manufactured with massive walnut from France. Dimensions in inches: 34.25 x 37 x 16.92.

2 **Charles de Mont Romain:** Small glass case, Louis Philippe style, manufactured with massive walnut from France, with 2 racks laid on rackrail and bevelled pane of glass. Dimensions in inches: 82.67 x 37 x 16.92.

3 **Duc de Saint Julien:** 2-door chest, Louis Philippe style, manufactured with massive walnut from France. Dimensions in inches: 38.18 x 53.93 x 19.29.

4 **Charles de Mont Romain:** 4-door glazed chest, Louis Philippe style, manufactured with massive walnut from France, with 2 racks laid on rack rail and bevelled pane of glass. Dimensions in inches: 84.64 x 53.93 x 19.29.

5 **Duc Saint Julien:** 3-door succession, Louis Philippe style, manufactured with massive walnut from France. Dimensions in inches: 38.18 x 71.65 x 19.29.

6 **Charles de Mont Romain:** 6-door glazed chest, Louis Philippe style, manufactured with massive walnut from France, with 2 racks laid on rack rail and bevelled pane of glass. Dimensions in inches: 86.61 x 71.65 x 19.29.

7 **Charles de Mont Romain:** 2-door bookcase, Louis Philippe style, manufactured with massive walnut from France, with 3 racks laid on rack rail and bevelled pane of glass. Dimensions in inches: 48.81 x 80.70 x 14.96.

24

WHARTON REPROGRAPHICS

FRONTIER ECONOMIES: ENTER IF YOU DARE

It's the Wild West again—in Russia, China, Vietnam, and parts of Latin America. But if these markets are to really grow, rampant crime and corruption will have to go

ON THE LOOKOUT IN MOSCOW: WITH SHOOTOUTS COMMON, SO ARE BODYGUARDS

D. DONSKY/... OK PRESS

WAITING FOR THE LAW: Strong growth needs more than reckless risk-taking

Every day, faxes hum, computer screens glow, and container ships pull into ports around the globe. Today, the veneer of modern capitalism can as easily be found in St. Petersburg as in San Francisco. But take a look just beneath the surface and you'll see a different form of economic life on the banks of Russia's Neva River or Brazil's Amazon–a scrappy, brutish, high-stakes game in which sheer nerve and raw energy count for more than rules, laws, or justice.

This is the frontier of capitalism, a zone of new economic activity that now includes stretches of the former Soviet Union, China, parts of Latin America, and Vietnam. Corruption and criminal activity are rampant, violence erupts regularly, legal systems are weak, and scams abound. The risks to life and limb–not to mention the pocketbook–are huge. But the winnings can be great for those who jump in.

Sustained growth requires more than just reckless risk-taking, however. Eventually, frontier economies need large capital infusions from outsiders–be they individual investors, corporations, or banks. And to make that leap to the next stage of growth, these economies will have to begin "civilizing." That is, they will have to put in place an array of laws and institutions, from effective judiciaries to functioning financial markets. By 2000, economies such as Russia and China should be well on their way toward making those changes.

SIGNS OF PROGRESS. Not all frontier economies make this next step–as the endemic lawlessness in places such as Sicily and Colombia shows. Still, there are signs of progress. Central Europe had a frontierlike atmosphere five years ago, after the Berlin Wall fell, and troubling pockets of crime and corruption remain. But civil codes governing private commercial transactions were updated, and financial markets have been developing rapidly.

Although Central Europe is well

ahead of China and Russia in this development process, there are civilizing signs in those countries, too. In China, village enterprises are taking government bureaucrats as well as other businesses to court for failing to meet their obligations. Russia has a new constitution, and a commercial code is in the making.

YOUNG AND HUNGRY. Frontier capitalism is only for the hardiest. In the U.S., most of the early homesteaders and miners in the West were young and relatively poor, yet better educated than their peers, and they were invariably great risk-takers, says Gary D. Libecap, an economic historian at the University of Arizona. There were many failed ventures, but the winners amassed wealth quickly.

It's no different in Moscow or Shenzhen. In Russia, the smartest ones started as early as 1987, when reforms were initially introduced under Mikhail Gorbachev. "There's always a first-mover advantage," notes Simon Johnson, program developer at the RJR Nabisco-Fuqua School of Business in St. Petersburg: "The biggest profits go to the first one to sell bananas, the first one to sell computers."

In China, the opening of the economy has produced thousands of success stories, along with tales of failure. Han Wei, a former commune husbandry official, started a business nine years ago with 50 chickens. Now, he's known as China's "Chicken King" and has a net worth of $25 million. Yet "there's a lot of churning in China," says Barbara Sands, economist at the University of Arizona. "There are bankruptcies, then new startups and new failures. A number of village enterprises do well because of one smart guy. Others fail repeatedly."

In Russia, China, and Central Europe, such fledgling private businesses are contributing markedly to economic growth. In Poland, 60% of employment and output comes from the private sector. In Russia, thanks mostly to rapid privatization, 70% of the workforce is on private payrolls.

It should come as no surprise that entrepreneurs are surviving without the laws and courts that U.S. businesses take for granted. Throughout history, a great deal of trade and business has been conducted through what economist Mancur Olson of the University of Maryland calls "self-enforcing markets"–that is, markets operating largely on mutual trust and individual responsibility. Today, self-enforcing markets are at work in the frontier economies.

At the same time, entrepreneurs in such markets–like the early robber barons in the U.S.–police their businesses and partners as they see fit, without concern for the law. Cornelius Vanderbilt, who rose from wharf rat to shipping magnate in New York City, once wrote to associates who had seized one of his properties: "Gentlemen, you have undertaken to cheat me. I will not sue you, for law takes too long. I will ruin you."

In the American West of the mid-1800s, prospectors displayed a more benign side of lawlessness. They evolved a system of self-government through "miners' clubs," says the University of Arizona's Libecap, which parceled out land claims and adjudicated disputes with relatively little violence. Eventually, federal law codified the miners' conventions.

Often, such self-government is extended within families and through ethnic networks, offering a way to make new ties and build businesses. Among the five major Chinese linguistic groups, business networks grew rapidly in this century. Trade in one sector of the rubber market, for example, was dominated by the Hokkien Chinese during the economic boom of the 1950s, says Janet T. Landa, an economist at York University in North York, Ont. Similar networks, part of the Chinese diaspora, have recently invested heavily in China and the Pacific Rim countries.

Yet ethnic networking can take other, more insidious forms. Chechen, Azerbaijanis, and other ethnic groups operate some of the most notorious gangs in Russia today. On-the-street gunfights for control of businesses and locations are familiar occurrences in Moscow, and bankers and other businesspeople routinely employ bodyguards and bouncers to protect themselves and their families.

It's scary. But many economists believe that these criminal elements will eventually recede in Russia, though there isn't any evidence of this happening so far. "It will become a comparative advantage to become honest and to honor contracts," predicts Judy Shelton, an economist at the Hoover Institution at Stanford University.

SLOW DAWNING. Even if that happens, government corruption, which is a problem in both Russia and China, could remain. "Corruption is endemic in almost all countries that are part-way between the statist and the market models," observes Jeffrey Sachs, a Harvard University economist who has advised both Poland and Russia in their transition to free-market economic policies. The most important thing, Sachs says, is to liberalize trade and end price controls. In Bolivia, even after 1985, when a license was no longer required to conduct certain businesses, people lined up to pay bribes to get one–until they finally realized that licenses, and hence the traditional bribes, were no longer necessary.

But it's another sort of lawlessness–the absence of clear property rights and laws governing everything from land to equity ownership–that hinders frontier economies from evolving toward more sustainable patterns of growth. Entrepreneurs need to raise capital in the markets rather than deal with only those they know and trust, or those they must bribe or fear. And they must have the recourse that an effective legal system can pro-

TAKING OFF

How frontier capitalism evolves

Stage One Statist economies collapse or fade away. Black marketeers profit enormously, with some becoming gangsters. Government corruption spreads.

Stage Two Small-scale entrepreneurs, often financed by family loans, flourish. Rule of law remains weak but businesspeople start evolving their own rules of commerce.

Stage Three Economic growth is brisk but hard to measure. Financial markets begin to evolve, tapping savings and attracting foreign institutional investors. Clearer legal code appears.

> → "It will become a comparative advantage to become honest"

vide when financial transactions go bad.

This institution-building is already well along in Central Europe. Poland has a powerful Securities & Exchange Commission and strict regulations governing share listings, credentials for brokers, and the like. Today, its market capitalization is $3.5 billion. The Czech Republic, with a more stable economy but with looser securities regulations, has a more volatile market, with a capitalization of $14 billion. European and U. S. institutional investors are taking an active interest in these economies as well as Russia's, where laws governing securities trading are more rudimentary.

HARD LESSONS. As in any case where fledgling markets begin to take off, speculative frenzies and scams are commonplace. Just last summer in Moscow, a pyramid scheme engineered by a mutual fund, MMM, collapsed and left several investors–most of them poor Russian citizens–empty-handed. However, such events don't seem to have turned people off to capitalism and free markets. "People learn through experience about speculative excesses," says Robert W. Vishny, an economist at the University of Chicago's Graduate School of Business.

Again, history offers some perspective. Financial scams were a regular occurrence in the U. S. when the markets were growing in the latter half of the 19th century and in the early years of the 20th century. Regulations didn't exist to protect investors, and greed was contagious.

Today, the impulse to get on the moneymaking bandwagon is no different in fast-growing frontier regions. And as regulations improve–provided they are not onerous–investment opportunities will broaden, and still more people will be drawn to the markets. That, and the effective introduction of legal codes governing transactions between private parties, should also pull in more institutional investors from overseas, especially those with deep pockets.

Scandals and failures will continue to make world headlines. But by the early 21st century, today's frontier economies could well be on their way toward becoming modern capitalist economies in reality as well as in appearance.

By Karen Pennar in New York, with Peter Galuszka in Moscow, Karen Lowry Miller in Bonn, and bureau reports

GERARD U. ...APHO